3.2 VR EOD Workspace Manual

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3.2

Version: 002

EOD Workspace Manual v3.2

Table of Contents

1 Revision History **7**

2 What you Will Find in This Guide **8**

2.1 Flight View 8

2.2 Dynamic Waypoint Positioning 8

2.3 Diagnostics View 8

2.4 Alarms 9

2.5 XBOX Controller Mapping 9

3 Flight View **9**

3.1 Cycling Views 11

3.2 Heading Bar 13

3.2.1 Heading 13

3.2.2 Pitch and Roll 13

3.2.3 Alarms 13

3.2.4 Compass Markers 14

3.3 Control Bar 15

3.3.1 Autopilot Jog Window 16

3.4 Depth and Altitude Bar 18

3.4.1 Depth 18

3.4.2 Altitude 18

3.4.3 Vehicle Setpoint 18

3.4.4 Visual Tracking 19

3.5 Mission View 19

3.5.1 Heads-Up Display (HUD) 20

3.6 Mission View Functions 20

3.6.1 Waypoints 20

3.6.2 Markers 20

3.6.3 Adjusting the Map Scale 21

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3.7 Mission View Pop-Up Menus 21
3.7.1 Map Pop-Up Menu 21
3.7.2 Waypoint Pop-Up Menu 22
3.7.3 Mission Pop-Up Menu 22
3.7.4 Region Pop-Up Menu 23
3.7.5 Marker Pop-Up Menu 23
3.8 Mission View Controls 24
3.8.1 Zero Depth 24
3.8.2 MOB (Man Overboard) 24
3.8.3 Clear Trail 24
3.8.4 Center On 24
3.8.5 Lock 25
3.9 Mouse Modes 25
3.9.1 Pan 25
3.9.2 Measure 25
3.9.3 Waypoints 25
3.10 Mission Selector 25
3.11 Mission View Tools 25
3.11.1 Missions Tab 25
3.11.1.1 Missions Subtab 26
3.11.1.1.1 Waypoints 26
3.11.1.1.1.1 Show All 26
3.11.1.1.1.2 Go To 26
3.11.1.1.1.3 Remove Waypoint 26
3.11.1.1.2 Missions 27
3.11.1.1.2.1 Execute Mission 27
3.11.1.1.2.2 Remove Mission 27
3.11.1.1.3 Waypoint Defaults… 27
3.11.1.1.4 Push 28

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3.11.1.1.5 Pull 28
3.11.1.1.6 Save 28
3.11.1.1.7 Load 28
3.11.1.1.8 Mission Defaults... 28
3.11.1.2 Regions Subtab 28
3.11.1.2.1 Regions 29
3.11.1.2.2 Region Points 30
3.11.2 Chart Items Tab 31
3.11.2.1 Markers Subtab 31
3.11.2.2 Man Overboard Subtab 32
3.11.3 Logging Tab 33
3.11.3.1 Logging Subtab 33
3.11.3.1.1 Record 33
3.11.3.1.2 Screencast 33
3.11.3.1.3 Mark 33
3.11.3.1.4 Convert to CSV 33
3.11.3.2 Playback Subtab 34
3.11.3.2.1 Browse 34
3.11.3.2.2 Clear 34
3.11.3.2.3 Play 34
3.11.3.2.4 Step 34
3.11.3.2.5 Loop 34
3.11.3.2.6 Speed Selector 34
3.11.4 Map Config Tab 35
3.11.4.1 Charts Subtab 35
3.11.4.1.1 Chart Visibility 35
3.11.4.1.2 Chart Opacity 35
3.11.4.1.3 Zoom to Layer 35
3.11.4.1.4 Layer Up / Layer Down 35

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3.11.4.1.5 Remove Layer 35
3.11.4.2 Misc. Subtab 36
3.11.4.2.1 HUD Text 36
3.11.4.2.2 Displayed Units 36
3.11.4.2.3 Misc. 36
3.11.4.2.3.1 Auto-hide bottom controls 36
3.11.4.2.3.2 Center Mode True 36
3.11.4.2.3.3 Hide Waypoint Text 36
3.11.5 Setup Tab 37
3.11.5.1 Position Declination Subtab 37
3.11.5.1.1 Position 37
3.11.5.1.1.1 Get Topside 37
3.11.5.1.1.2 Update Vehicle Position 37
3.11.5.1.2 Declination 37
3.11.5.1.2.1 Auto Declination 37
3.11.5.1.2.2 Lookup Declination 38
3.11.5.1.2.3 Update Vehicle 38
3.11.5.1.3 OPENINS TOOLS 38
3.11.5.1.3.1 Reset to GPS 38
3.11.5.1.3.2 Reset To USBL 38
3.11.5.2 Ship Config Subtab 39
3.11.5.3 Nav Items Subtab 39
3.12 Control Tools 41
3.12.1 Cam Tab 41
3.12.2 LEDs Tab 42
3.12.3 Sonar Control Tab 42
3.12.4 Tracking Control Tab 43
3.12.5 Power Tab 43
3.12.6 Joystick Gains Tab 44

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4 Dynamic Waypoint Positioning **45**
4.1 The Waypoint 45
4.1.1 Types of Waypoints 46
4.2 Enable Positioning 46
4.2.1 Using a Waypoint to Control your Vehicle 47
4.3 Controlling the Vehicle using Dynamic Positioning 47
4.3.1 Step Size Controls 47
4.3.2 Right Click and Go 48
4.3.3 Vehicle Speed 48
4.4 Creating a Mission Using Multiple Waypoints 48
4.5 Dynamic Line Positioning 51
4.5.1 Waypoint Order 51
4.6 Multiple Missions 52
4.6.1 Differentiating Between Missions 52
4.6.2 Changing Missions 52
4.6.2.1 Directing to the 1st vs Subsequent Waypoints 53
4.6.3 Adding Waypoints to a Specific Mission 53
4.7 Editing Waypoint Details 53
4.8 Using the Mission Tab 54
4.8.1 Selecting Waypoints Using the Mission Tab 54
4.8.2 Selecting Missions Using the Missions Tab 54
4.8.3 Saving Missions 54
4.8.4 Changing Mission and Waypoint Defaults 55
4.9 Point of Interest Control 55
4.9.1 Setting your POI 55
4.9.2 Controlling the vehicle with the POI 56
4.9.3 Using the Sonar Fan and POI 56
4.10 Waypoints and Regions 57
4.10.1 Creating a Mission Using Regions 57

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4.10.2 Creating a Region 57
4.10.3 Creating a Mission using a Region 57
4.10.4 Region and Mission Interaction 59
5 Diagnostic View 59
5.1 Vehicle Configuration 59
5.1.1 Temperature 60
5.1.2 Joystick Data 60
5.1.3 Buttons 60
5.1.4 Video Overlay 60
5.2 Vehicle Network 61
5.3 Vehicle Sensors 62
5.4 Positioning 63
6 Alarms 64
7 Controller Mapping 65
7.1 Raw Controller Inputs 65
7.2 Static Controller Inputs 66
7.3 Pitch/Roll Mode 67
7.4 Sonar Mode 68
7.5 Camera Lights Mode 69
7.6 Manip Mode 70

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1 Revision History

Revision	Initials	Date	Comments
001	CB	02.21.2020	Initial doc
002	CB	02.24.2020	Fixed issue in 7.1 where the right shoulder was labeled left shoulder.

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Greensea's EOD Workspace represents years of development resulting in a robust, user-oriented platform to complete mission objectives. Workspace allows operators to use a single screen interface to easily direct and maneuver your vehicle and quickly adapt to changing mission objectives. It is designed and able to be used on multiple devices and configurations.

2 What you Will Find in This Guide

This guide is separated into five sections: Flight View, Dynamic Waypoint Positioning, Diagnostics View, Alarms, and XBOX Controller Mapping.

2.1 Flight View

Flight View is the operational side of Workspace. It is the primary view that you will interact with as you plan, conduct, and review missions. This section will describe the functions available in Flight View.

2.2 Dynamic Waypoint Positioning

Dynamic Waypoint Positioning describes the tools and features available within Workspace that help you control the vehicle. This section will walk you through how to use Workspace to control your vehicle.

2.3 Diagnostics View

The Diagnostics View is used to access the functions and systems of the vehicle. If you are trying to diagnose an issue with your sensors, this is the place to start.

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2.4 Alarms

Alarms are a visual alert that will trigger when specific criteria are met. These can be based around any signal, this can include things like the vehicle reaching a certain depth, or a loss of comms. This section will describe the alarms on your system.

2.5 XBOX Controller Mapping

This section details the controller inputs and modes when using the XBOX Controller.

3 Flight View

Flight View is what you will be using for the majority of the time when performing tasks and completing operations. All navigational readouts and tools for directing the vehicle and planning missions are found in this view.

This section is organized by the widgets that are a part of Flight View and describes their functions.

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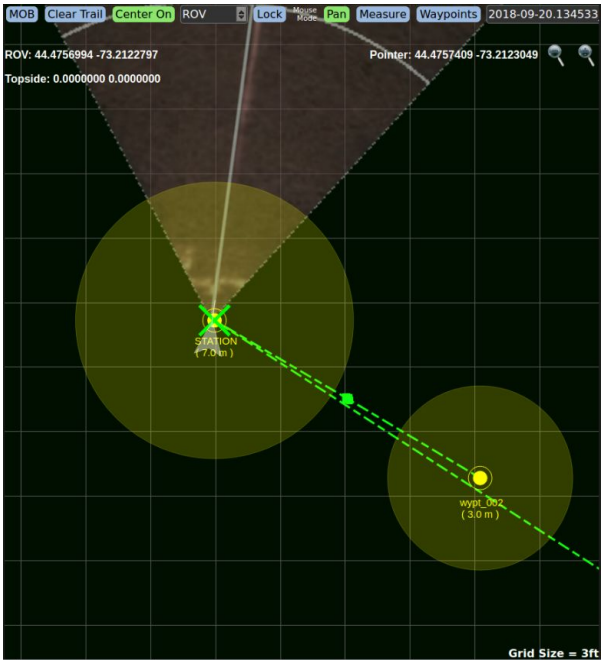
Heading Bar

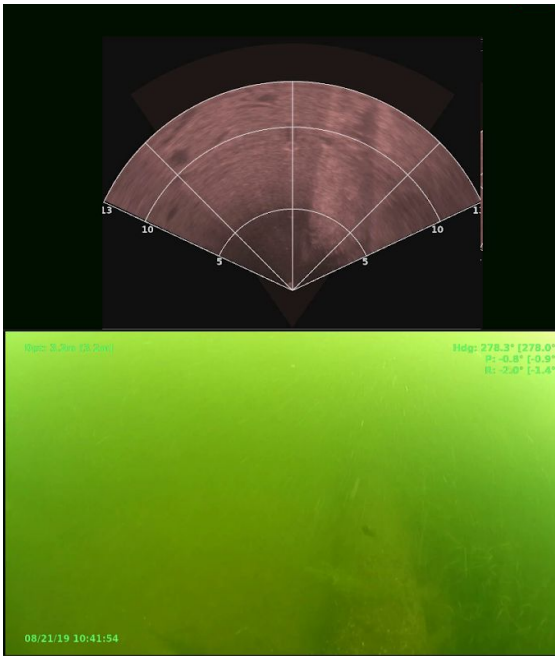
Control Bar

Depth & Altitude Bar

Mission View

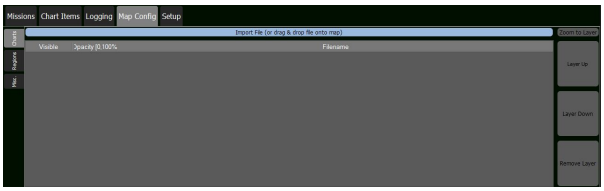


Sonar & Video View



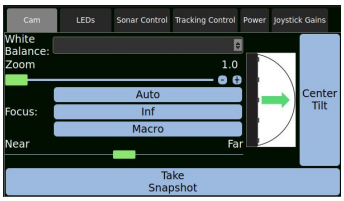
Mission View Tools

(Appears at the bottom of Mission View)



Control Tools

(Appears at the bottom of Sonar and View View)



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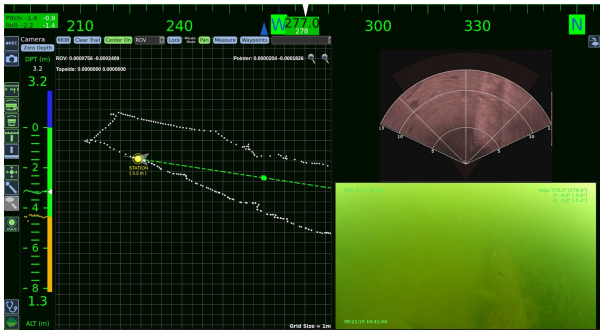
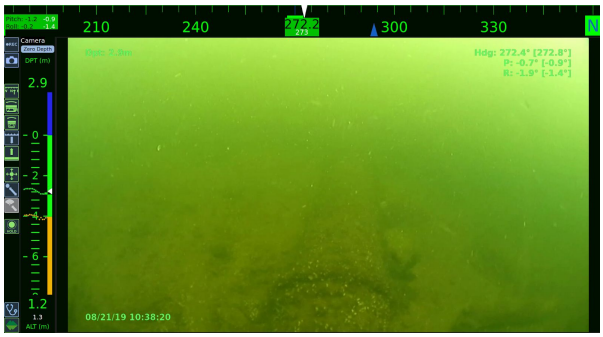
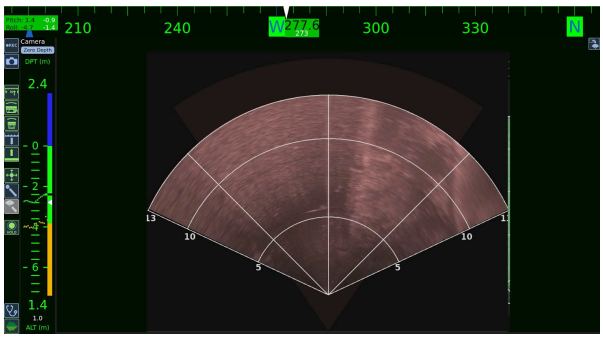
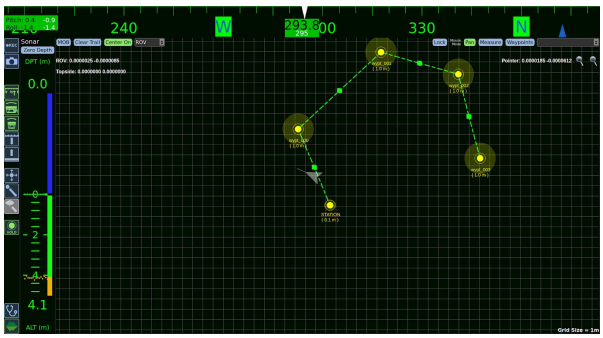
3.1 Cycling Views

You are also able to cycle through default Workspace views using the F1 - F6 keys.

Key and Description	Image
F1 - Default View • Returns Flight View to its default state.	

F2 - Video View
• Focuses on Video
• Areas shown
  ○ Video
  ○ Heading Bar
  ○ Control Bar
  ○ Depth and Altitude
	

F3 - Sonar View
• Focuses on Sonar
• Areas shown
  ○ Sonar
  ○ Heading Bar
  ○ Control Bar
  ○ Depth and Altitude
	

F4 - Mission View
• Focuses on Mission View
• Areas shown
  ○ Mission View
  ○ Heading Bar
  ○ Control Bar
  ○ Depth and Altitude
	

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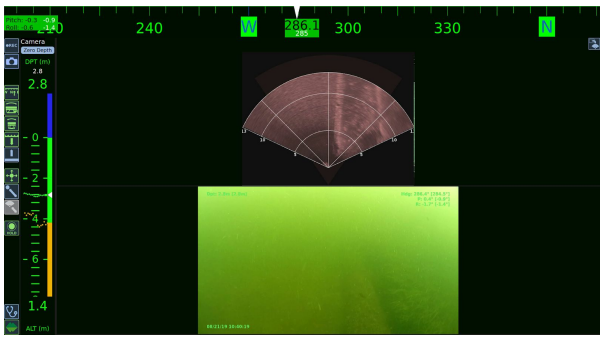
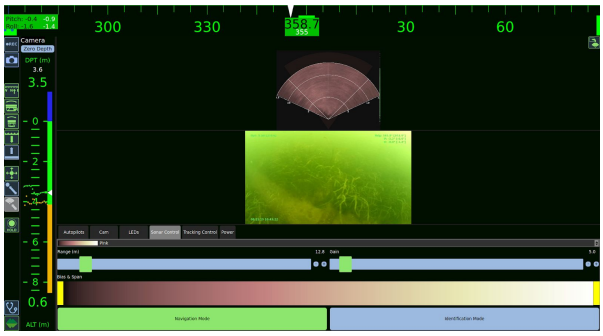
Key and Description	Image
F5 - Sonar and Video View ● Focuses on Sonar and Video Together ● Areas shown ○ Sonar and Video ○ Heading Bar ○ Control Bar ○ Depth and Altitude	
F6 - Show/Hide Control Tools **NOTE:** Will only be shown in views that include sonar or video.	

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3.2 Heading Bar

The Heading Bar displays the vehicle pitch and roll, heading, course over ground, and any alarms that are currently active. The compass is centered on the current vehicle heading.

3.2.1 Heading

The current heading is displayed in black. If auto-heading is enabled, there will be a smaller number displayed using white text beneath the Current Heading, this is the Vehicle's Heading Setpoint. The setpoint is also known as the commanded heading.

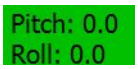
Auto-heading Disabled

Auto-heading Enabled

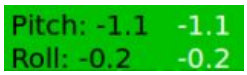
3.2.2 Pitch and Roll

The vehicle's current pitch and roll is displayed in black text. If auto-pitch and roll is enabled, there will be a smaller number in white to the right of the current pitch and roll. These are the pitch and roll setpoints.

The pitch setpoint can be controlled from the hand controller. The roll setpoint can be locked at the current position or zeroed using the hand controller.



Auto-Pitch and Roll Disabled



Auto-Pitch and Roll Enabled

3.2.3 Alarms

Alarms will appear on the right side of the Heading Bar. For more information about alarms, please see 6 Alarms.

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3.2.4 Compass Markers

There are two compass markers or "carrots" displayed on the Heading Bar. These markers may or may not be displayed depending on the orientation of the vehicle and if you are using auto-heading.

	Heading Setpoint	The commanded heading. This is only visible if Auto Heading is enabled.
	Course Over Ground	This is the direction your vehicle is currently traveling and is independent of Heading. The Heading Bar prioritizes vehicle heading, so the Course Over Ground marker will not always be displayed. Instances where this might occur include if the vehicle is lateralling or traveling backwards.

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3.3 Control Bar

The Control Bar is a collection of icons toggle used to access vehicle functions and toggle navigation modes for the vehicle.

Each Icon in the control bar can have three possible states.

- Enabled - When the icon is green, the function is enabled.
- Disabled - When the icon is blue, the a function is disabled.
- Inactive - When the icon is gray, the function is unavailable.

Icon	Name	Function
	Record	Toggles mission logging. When enabled, the icon will turn green, and Logging will appear at the top of Mission View.
	Screenshot	Take a screenshot of the current Workspace View.
	Auto-heading	Toggles auto-heading. When enabled, the vehicle controls will use the heading setpoint to direct the vehicle. This will start with the current heading.
	Auto-depth	Toggle auto-depth. When enabled, the vehicle will maintain and follow the depth set point. This will start with the current depth. Toggling Auto-depth on will disable auto-altitude and vice versa.
	Auto-altitude	Toggles auto-altitude. When enabled, the vehicle will maintain and follow the depth set point. This will start with the current altitude. Toggling Auto-altitude on will disable auto-depth and vice versa.
	Auto-Pitch	Toggles Auto-Pitch. When enabled, the vehicle will maintain and follow the Pitch setpoint. Pitch can be controlled and zeroed from the hand controller.
	Auto-Roll	Toggles Auto-Roll. When enabled, the vehicle will maintain its current roll. Roll can be zeroed from the hand controller.
	Positioning	Toggles positioning. Toggling positioning will always stop the vehicle. When toggled to enabled, positioning will drop a waypoint at the vehicle position. While positioning is active you will be moving the waypoint and the vehicle will follow it. When positioning is toggled off the vehicle stops and is returned to direct user control.
	Point of Interest	Toggles point of interest mode. Allows you to place a Point of Interest marker. Vehicle control will orient itself to the point of interest.
	Sonar Target Control	Sonar Target Control is only available when using Sonar Target Tracking. When Enabled, vehicle control will be oriented to the selected sonar target.

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Icon	Name	Function
	Hold	Toggles Waypoint Hold. When enabled and conducting a mission the vehicle will stop and hold its position at the current active waypoint. When disabled and conducting a mission upon achieving an active waypoint the system will move the active waypoint to the next waypoint in the mission. Hold will become inactive when at the last waypoint in a mission.
	Autopilot Jog Window	Toggles the Autopilot Jog window. This window is where you will find the Autopilot controls.
	Diagnostics View	Changes to the diagnostic view.
	Flight View	The default Workspace View, this will be used for day-to-day vehicle operation.

3.3.1 Autopilot Jog Window

Opened by using the icon in the Control Bar, the Autopilot Jog Window allows you to control the vehicle while using Dynamic Waypoint Positioning, or executing a mission. For more information on Dynamic Positioning, look at 4 Dynamic Waypoint Positioning.

The Autopilot Jog Window is its own window, but it can be docked to the left side of Workspace by moving it to the left of the Control Bar.

NOTE: Many of the controls in the Autopilot Jog Window require you to be executing a mission, using auto-heading, auto-depth, and/or be in positioning to use autopilot controls.

Icon	Name	Function
	Reverse	Reverses the order of the waypoints the vehicle is traveling. Only usable if the vehicle is executing a mission.
	Back	Commands the vehicle to travel to the previous Waypoint on its current mission. Only usable if the vehicle is executing a mission.
	Pause	When Active (Green) the vehicle will stop at the Waypoint it is currently traveling towards. Only usable if the vehicle is executing a mission.
	Forward	Commands the vehicle to travel to the next waypoint in order. Only usable if the vehicle is executing a mission.
	Speed Control	Increases or reduces the speed at which the vehicle travels between Waypoints. Requires the vehicle to be in transit to a waypoint.

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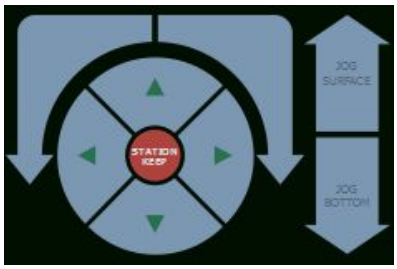

Jog Controls

Jog controls will control the location of the current Vehicle Waypoint. These will move from the perspective of the Vehicle.

The curved arrows require the vehicle to be using auto heading and/or positioning.

The Jog Surface and Jog bottom controls require the vehicle to be using auto-depth and/or positioning.

The Directional buttons require the vehicle to be in positioning mode.

Step Control

Step Control changes the distance the jog commands.

Each click of the jog controls will move the vehicle or waypoint a distance defined by the step controls.*

*This will be metric or imperial as defined in the Mission View Tools.

Speed Lock

Green - Vehicle Heading will be dictated by the current mission waypoint.

Blue - You have active control of the vehicle speed.

Heading Lock

Determines whether or not you have independent control of heading while the vehicle is on a mission.

Green - The Vehicle Heading will be dictated by the current mission waypoint.

Blue - You are able to control the vehicle heading independent from the current waypoint.

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Depth Lock

Determines whether or not you have independent control of depth while the vehicle is on a mission.

Green - The vehicle depth will be dictated by the current mission waypoint.

Blue - You are able to control the vehicle depth independent from the current waypoint.

3.4 Depth and Altitude Bar

The Depth and Altitude Tracker Bar tracks the depth and or altitude of the vehicle. These are tracked in Meters or Feet depending on your settings, which are applied from the Mission View Tools.

3.4.1 Depth

The vehicle's current depth is displayed at the top of the tracker. If Auto-depth is enabled, the depth setpoint will be displayed as a white number above the current vehicle depth. The setpoint is the current commanded depth of the vehicle, the setpoint will be shown as a white marker on the depth and altitude bar.

3.4.2 Altitude

The vehicle's current altitude is displayed at the bottom of the tracker. If Auto-altitude is enabled, the altitude setpoint will be displayed as a white number below the current vehicle altitude. The setpoint is the current commanded location of the vehicle, the setpoint will be shown as a white marker on the visual tracking bar.

3.4.3 Vehicle Setpoint

The vehicle setpoint is shown by both a white number and white marker on the visual tracking bar. This is the commanded depth (or altitude) the vehicle will attempt to achieve and hold.

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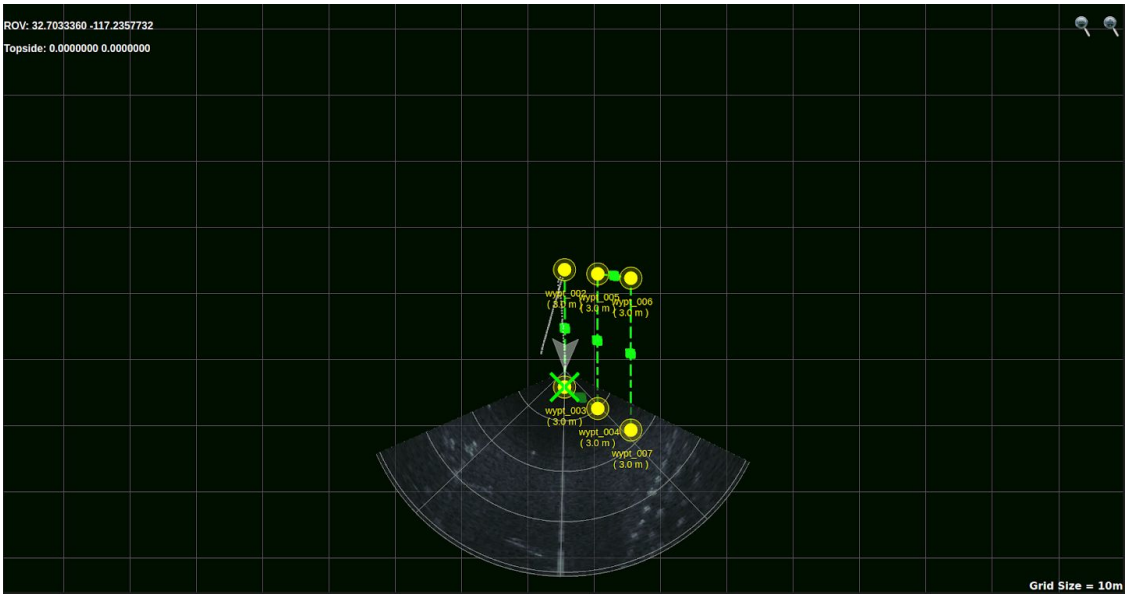
3.4.4 Visual Tracking

The vehicle's current and recent historic vertical position is tracked by the green dots or breadcrumbs, the spacing of these dots can be used to show how fast or slow the vehicle is moving vertically. If you have achieved bottom lock with the Doppler Velocity Log (DVL) you will see the bottom tracked with orange breadcrumbs.

The vehicle tracking meter bar displays three colors:

- Blue - Showing above water.
- Green - Showing the water.
- Orange - Tracking the location of the bottom.

3.5 Mission View



Mission View is a 2D display that shows vehicle, ship, and the vehicle's position, ship's position, and any active charts that have been imported. You will be using Mission View to plan and conduct missions.

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3.5.1 Heads-Up Display (HUD)

The Mission View HUD is superimposed across the four corners of the Mission View. It can be enabled or disabled from using the Mission View Tools under the Map Config tab, in the Misc. subtab.

The top-left HUD shows the vehicle position.

The top-right HUD shows the current coordinates of the cursor.

The bottom-left HUD shows the results of the last measurement taken with the Measure Tool.

The bottom-right HUD shows the current scale of Mission View.

3.6 Mission View Functions

3.6.1 Waypoints

Waypoints are the fundamental control unit used to direct a vehicle in Workspace. Waypoints are used to station keep or used to create a mission. Waypoints are described more completely in 4 Dynamic Waypoint Positioning.

3.6.2 Markers

Markers are used to note specific locations on the map they are not part of a mission.

To add a marker to the map, right-click on the location you want to place a marker and select Add Marker.

Unselected markers are green, while a selected marker is cyan. You can adjust the position of markers by clicking and dragging them to the desired location on the map, or by manually setting editing their position parameters in the Markers menu.

Markers can be locked along with Waypoints by clicking the Lock button in the upper-right corner of Mission View.

All Marker data can be accessed from the Mission View Tools, selecting Chart Items tab, and then the Markers subtab.

To delete markers, right-click the marker you want to remove and select Delete. Alternatively, select the marker from the list from the Mission View Tools, selecting Chart Items tab, then the Markers subtab, and click the red X in the Delete column of the marker.

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3.6.3 Adjusting the Map Scale

You can click the magnifying glasses located next to the Grid Size in the upper-right corner of the map. Alternatively, if you are hovering your cursor over the map, you can use the mouse scroll wheel to zoom in and out.

3.7 Mission View Pop-Up Menus

By right-clicking locations and objects in Mission View, you are able to open a menu of options allowing you to quickly interact with items in Mission View.

3.7.1 Map Pop-Up Menu

By right-clicking an open area on Mission View, a general pop-up menu with the following selections.

Menu Item	Description
Add and Goto Waypoint	Creates a new waypoint and commands the vehicle to travel to the selected location. This Waypoint will be part of a new mission. The vehicle will only begin traveling to this waypoint if Positioning is Enabled.
Add Waypoint	Creates a Waypoint at the selected location. This Waypoint will be part of the currently selected mission.
Add Marker	Creates a marker at the selected location.
Set Point of Interest	Sets a point of interest and enables Point of Interest Mode. Vehicle controls will be oriented towards the Point of Interest.
Copy Position	Copies the latitude and longitude location of the cursor.
Set Position	Resets the vehicle position on the map to the location of the cursor. **NOTE:** If you are using Positioning and set a new position, the vehicle will attempt to move to its current waypoint.

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3.7.2 Waypoint Pop-Up Menu

Right-clicking a Waypoint opens a waypoint specific pop-up menu with the following options.

Option	Description
Edit Waypoint...	Opens the Waypoint Editing Window to edit waypoint details.
Go to Waypoint	Commands the vehicle to go to the selected Waypoint. This will change the current mission to the mission that includes the selected Waypoint.
Set Point of Interest	Sets a point of interest and enables Point of Interest Mode. Vehicle controls will be oriented towards the Point of Interest.
Edit Mission...	Opens the Edit Mission Window for the selected Mission.
Execute Mission	Commands the vehicle to execute the selected mission starting with the first waypoint. NOTE: If reverse is enabled in the autopilot jog window the vehicle will go to the last waypoint in the mission.
Add to Mission...	Opens a dialogue to add the selected Waypoint to a mission.
Lock/Unlock Waypoint	Toggles locking of the selected Waypoint. If lock is enabled, it disables click-and-drag for the waypoint, preventing the waypoint from accidentally being moved.
Hide/Show Waypoint Tolerance	Toggles the display of the current waypoint tolerance radius.
Delete Waypoint	Deletes the selected Waypoint.

3.7.3 Mission Pop-Up Menu

The Mission Pop-Up Menu is accessed by right-clicking the blocks connecting Waypoints.

Option	Description
Edit Mission...	Opens the Edit Mission Window for the selected Mission.
Add to Mission...	Opens a dialogue to add the selected mission to another mission.
Remove Mission	Deletes the selected Mission.
Execute Mission	Commands the vehicle to execute the selected mission.

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3.7.4 Region Pop-Up Menu

Additional Options are added when you right-click on a region on Mission View.

Option	Description
Set Coverage	Opens the Region Coverage Window. From this window, you are able to create a mission to cover the defined region.
Clear Coverage	Deletes the mission created for this Region.
Execute Mission	Commands the vehicle to execute the mission associated with the Region.
Toggle Exclusion Zone	Toggles the region to become an Exclusion Zone. This is a visual reminder to avoid an area. NOTE: An exclusion zone is a visual reminder only, and will not prevent the vehicle from region the area if commanded. NOTE: If a mission is associated with the Region, this will delete the mission.
Unlock Region	Unlocks the region. When unlocked, you are able to click and drag the region reference point to move the region, or click and drag the other vertices of the region to reshape it.

3.7.5 Marker Pop-Up Menu

Right-clicking a marker opens a pop-up menu with the following options.

Option	Description
Go to Marker	Commands the vehicle to go to the selected marker.
Delete Marker	Deletes the selected marker.
Show/Hide Safety Zone	Toggles the display of the safety zone surrounding the Marker. A Safety Zone is a visual indicator on Mission View noting an area to be cautious of. NOTE: The Safety Zone is a visual reminder only, and will not prevent the vehicle from entering the area if commanded.

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3.8 Mission View Controls

The top of Mission View includes several controls. Their functions are described below.

3.8.1 Zero Depth

Located above the Depth and Altitude gauge. This will reset the depth to zero. This is usually done before the start of a mission to allow for altitude differences between operating environments.

3.8.2 MOB (Man Overboard)

Man Overboard (MOB) is a specialized marker that saves vehicle location, attitude, and time created.

To create a MOB marker, click the MOB button in the top-left corner of Mission View. Unlike standard markers, the MOB records instantaneous vehicle attitude and position when the button is pressed.

Man Overboard Marker appears as a green triangle beneath the vehicle with the triangle pointing in the direction of the vehicle heading when the MOB was created.

MOB marker data is stored in the Man Overboard tab under Chart Items in the Mission View Tools.

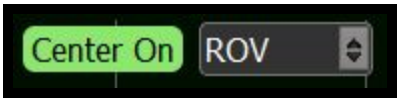
If Display Range/Bearing is enabled from the MOB tab on the navigation menu, it will display in the upper-left corner of Mission View.

3.8.3 Clear Trail

Clicking this button will clear the vehicle breadcrumb trail on the map. It will preserve all Markers and Waypoints.

3.8.4 Center On

When enabled (highlighted green), Center On will keep the Map focused on the item selected from the dropdown to the right, in the case of the example to the right, the map will be focused on the ROV. The map will continue to snap the ROV to the center of Mission View whenever it moves off the visible area, or you move the map away from the ROV.



There is an alternate Center On mode, the True mode will keep the vehicle in the center of Mission View. This is changed from the Mission View Tools.

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3.8.5 Lock

Locks all waypoints and markers. When a lock is active, it will be colored green.

3.9 Mouse Modes

3.9.1 Pan

Pan mode allows you to use the mouse to pan Mission View. It is enabled by default. When enabled, you click click and drag the mouse to move the map.

NOTE: If you have Center On True enabled, you will be unable to move the map. If you are using Center On Bounded, Mission View will snap back to the object you are centered on. This is described in 3.10.5.3.2 Center Mode True.

3.9.2 Measure

Measure tool allows you to click and drag the mouse to measure the distance and heading between the point clicked and the point the mouse was released. After measuring, the coordinates of the two points will display in the bottom left corner of Mission View, the distance between and bearing between the two points will appear at the termination of the measurement. These will remain on screen until the map is clicked again.

3.9.3 Waypoints

When enabled, Waypoints Mode allows you to left-click to add a waypoint to the currently selected mission. Missions are selected from the drop-down menu to the right of the Waypoints button.

3.10 Mission Selector

In the upper right corner of Mission View. The Mission Selector allows you to select an already created mission to add waypoints to. Missions can be selected. You can also use the mission selector to create a new mission.

3.11 Mission View Tools

The Mission View Tools are located at the bottom of Mission View and are usually hidden. It can be accessed by either hovering over the bottom of Mission View, or by using the drag handle at the bottom of Mission View. It is made up of five main tabs: Missions, Chart Items, Logging, Map Config, and Setup.

3.11.1 Missions Tab

You are able to interact with waypoints, missions, and regions directly using Mission View. However, you are also able to interact with waypoints and missions from the Missions Tab.

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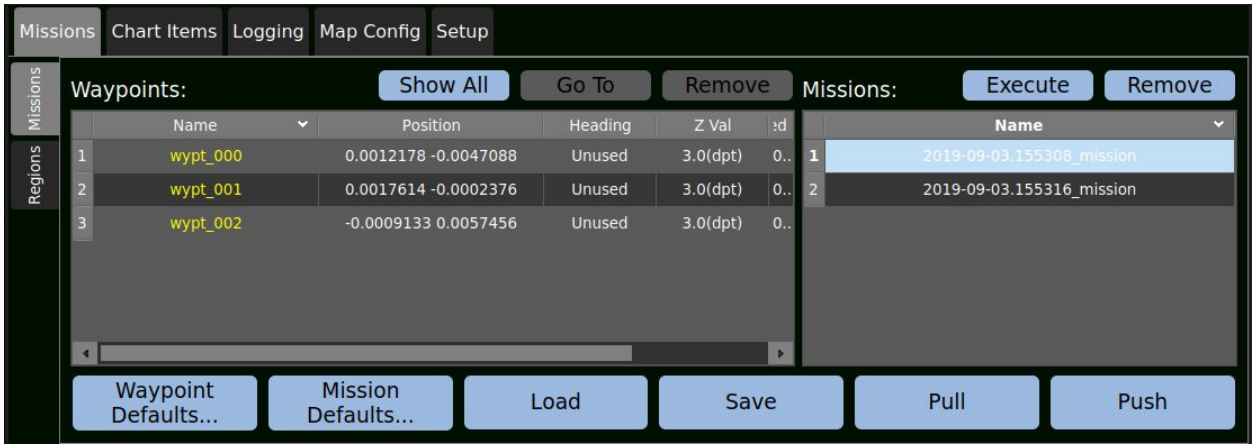
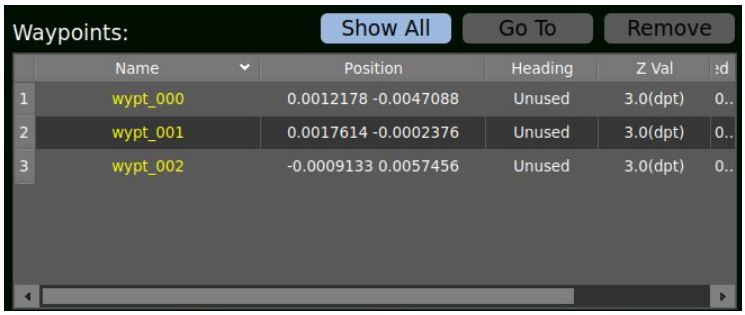
3.11.1.1 Missions Subtab

The Missions Subtab is separated into two smaller areas: Waypoints and Missions.



3.11.1.1.1 Waypoints

The Waypoints list typically only shows the waypoints that are part of the mission selected from the mission list to the right. You are able to select a specific waypoint from the list or double click it to open the edit waypoint window. You are also able to ctrl+click or Shift+click to select multiple waypoints from the list.



3.11.1.1.1.1 Show All

The Show all button will display all waypoints currently in Mission View regardless of the mission they are a part of.

3.11.1.1.1.2 Go To

The Go To button commands the vehicle to go to the selected Waypoint.

NOTE: If Dynamic Waypoint Positioning is not enabled, the system will enable Dynamic Waypoint Positioning and begin traveling to the waypoint.

3.11.1.1.1.3 Remove Waypoint

Removes the currently selected waypoint.

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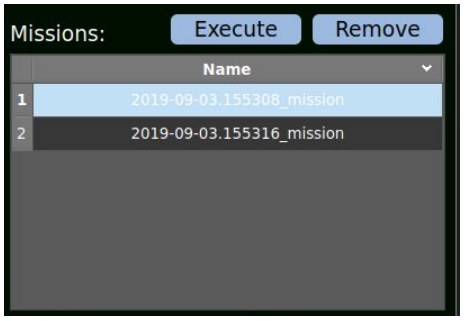
3.11.1.1.2 Missions



3.11.1.1.2.1 Execute Mission

Execute Mission commands the vehicle to execute the currently selected mission.

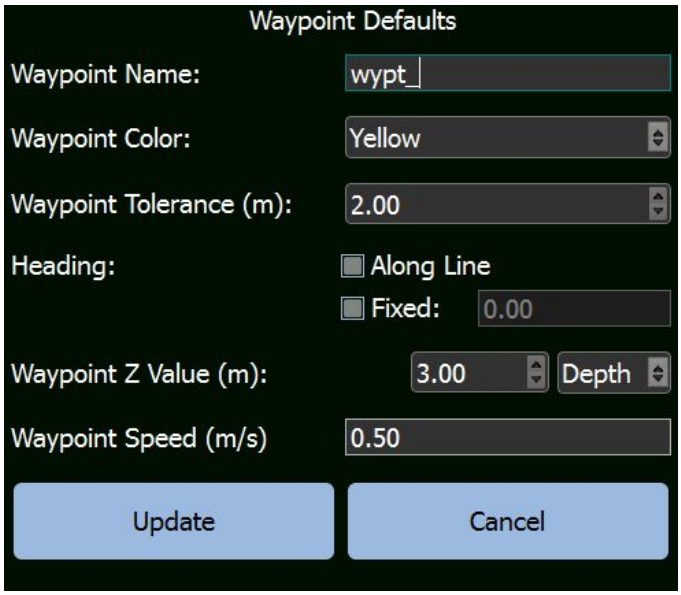
3.11.1.1.2.2 Remove Mission

Deletes the currently selected mission.

NOTE: Removing a mission cannot be undone and does not require confirmation. If you want to reuse a mission, make sure to save it prior to removing it.

3.11.1.1.3 Waypoint Defaults…

Opens the Waypoint Defaults window. This will allow you to edit the default values for future waypoints created in Workspace.



Waypoint Name	Sets the default prefix for waypoints.
Waypoint Color	Allows you to pick the default color for waypoints.
Waypoint Tolerance	Sets the default tolerance for waypoints. The Tolerance is the area surrounding the waypoint that the vehicle must reach in order to consider the waypoint achieved. A larger tolerance is easier to achieve.

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Heading	Sets the default heading for the vehicle as it travels towards a waypoint. If no option is selected the vehicle will point towards the Waypoint. Along Line means that the vehicle will "look towards" the line as it travels toward a waypoint Fixed which allows you to define a default heading the vehicle will maintain while traveling to a waypoint.
Waypoint Z Value	Z Value (m) allows you to define a default vertical location for waypoints. This will be either depth or altitude and will be informed by the waypoint tolerance.
Waypoint Speed	The default speed the vehicle will use as it travels to a waypoint.

3.11.1.1.4 Push

NOTE: This functionality is disabled in EOD Workspace.

3.11.1.1.5 Pull

NOTE: This functionality is disabled in EOD Workspace.

3.11.1.1.6 Save

Saves all markers, waypoints, and missions to a .yml file.

3.11.1.1.7 Load

Loads previously saved waypoints and missions from a .yml file

3.11.1.1.8 Mission Defaults...

Opens the Mission Defaults Menu, allowing you to edit the default Mission Color and name suffix. This will apply to all future waypoints and missions.

3.11.1.2 Regions Subtab

The Regions Subtab allows you to create and edit regions on the map. Regions are defined areas of the map that can be used to automatically create missions covering the created region

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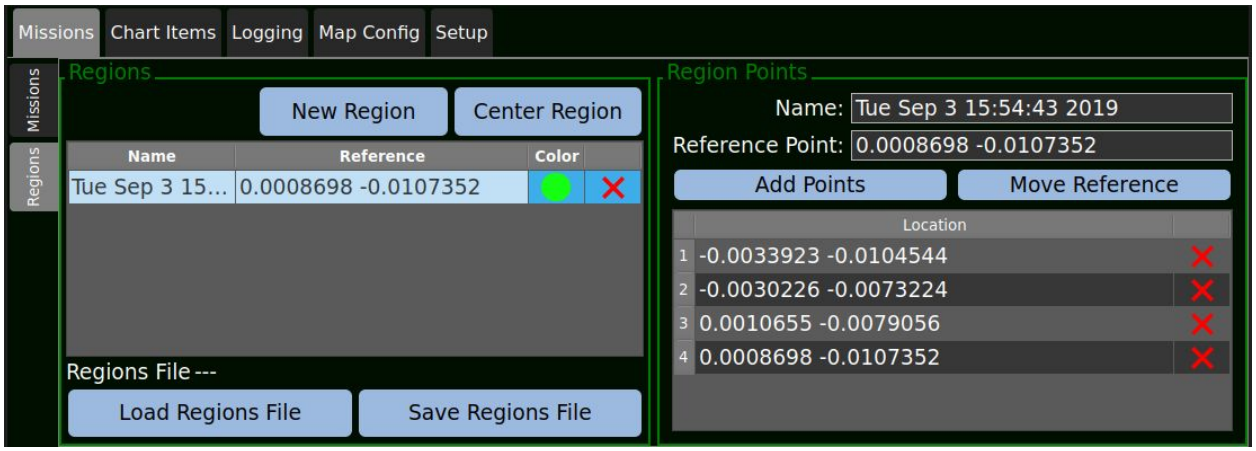
3.11.1.2.1 Regions

Displays a list of all created regions.



Button	Function
Move All Regions	Unlocks all regions together.
New Region	Starts creation of a new region.
Center Region	Centers the map on the datum for the region selected from the region list.
Load Regions File	Loads a previously saved region.
Save Regions File	Saves all regions into a YML file.

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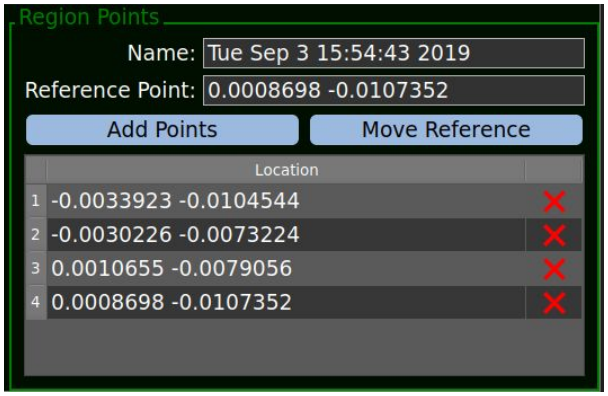
3.11.1.2.2 Region Points

The Region Points area allows you to work with the individual points within the selected region. To interact with the Region Points area you need to first select a region from the regions list to the left.



Button	Function
Add Points	Turns on point adding mode. While active (green) clicking on the map will add an additional point to define the region. When you have completely defined a region you can disable Add Points.
Move Reference	Move Reference, when enabled, will move the defined region datum to the location when you click the map.

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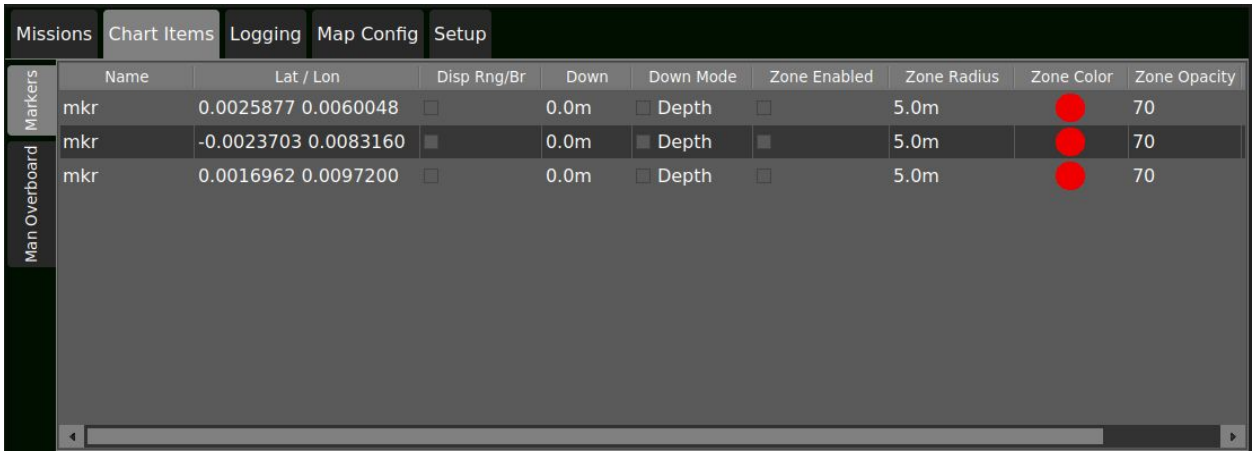
3.11.2 Chart Items Tab

The Chart Items tab allows you to interact with markers appearing on Mission View.

3.11.2.1 Markers Subtab

Lists all markers currently in Mission View. Marker properties can be edited by double-clicking the fields in the table shown below.



Field	Description
Name	Unique identifier given to a specific marker.
Lat/Lon	The marker's latitude and longitude, measured in degrees.
Disp Rng/Br	Shows or hides the range and bearing of a marker in the top left HUD.
Down	The vertical position of the marker. This is either measured from the surface or the bottom as dictated by the Down Mode.
Down Mode	Toggles how the vehicle's vertical position is measured. The field displays the current down mode. Depth measures from the surface, Altitude measures from the bottom.
Zone Enabled	Enables or disables a Safety Zone displayed the marker.
Zone Radius	Sets a Safety Zone radius around the marker.
Zone Color	The color of the Safety Zone around the marker. The color can be changed by double-clicking on the circle and selecting a new color from the menu that appears.
Zone Opacity	Changes the shading of a Safety Zone. A higher zone opacity will result in a more darkly shaded zone. This can be changed by double-clicking the zone opacity field, pressing the up and down arrows, or manually entering the desired value.
Delete	Removes a marker from the map by clicking the red 'X' in the delete field.

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3.11.2.2 Man Overboard Subtab

Lists all MOB markers. Each MOB property can be edited by double-clicking the field in the table shown below.

Field	Description
Name	The default for a MOB marker is mob.
Lat/Lon	The vehicle's latitude and longitude when the MOB button was clicked.
Disp Rng/Br	Enables or disables the Range and Bearing of the MOB marker in relation to the vehicle in the top left HUD.
Down	The vertical position of the marker.
Roll	The roll of the vehicle when the MOB button was clicked.
Pitch	The vertical tilt of the vehicle when the MOB button was clicked.
Heading	The heading of the vehicle when the MOB button was clicked.
Created	The system time when the MOB button was clicked.
Delete	Removes the MOB from the map by clicking the red 'X' in the delete field.

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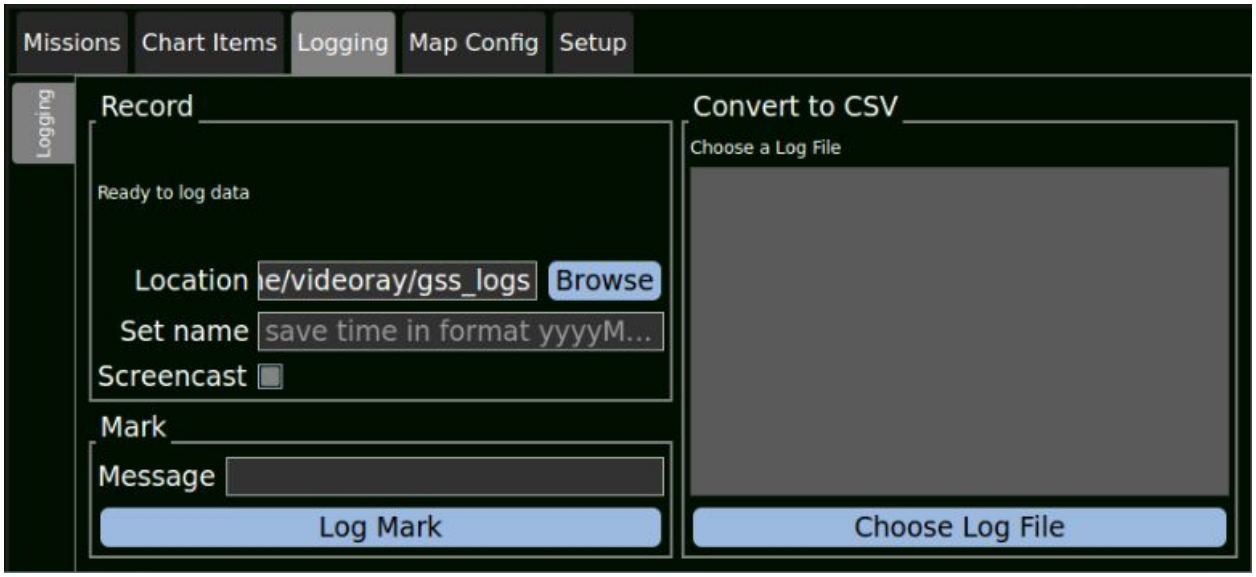
3.11.3 Logging Tab

3.11.3.1 Logging Subtab

NOTE: This Subtab is only available in EOD Workspace, if you have launched Playback EOD Workspace, you will see the Playback Subtab.



NOTE: Logging can be more quickly initiated by using the Rec Icon found on the Control Icon Menu.

3.11.3.1.1 Record

Starts mission recording of your current Workspace session. The record button toggles the recording of data. The log will be saved in the location dictated by the Location field. When recording Workspace will create three files a telemetry file and two MP4 videos of the video feed and the sonar feed.

NOTE: Stop logging prior to closing Workspace.

3.11.3.1.2 Screencast

When the screencast checkbox is checked, Workspace will create a third MP4 file when taking a log. This MP4 is a video log of Workspace as it was being used by the operator.

NOTE: You may notice a visual slowdown when recording a screencast.

3.11.3.1.3 Mark

Clicking the Mark button creates a mark in the playback. This can be used to note an event that has occurred during an in-process recording.

3.11.3.1.4 Convert to CSV

Opens a file viewer to select a log file to be converted to a CSV file.

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3.11.3.2 Playback Subtab

NOTE: This subtab is only available in Playback EOD Workspace, if you are in EOD Workspace you will only see the Logging Subtab.

3.11.3.2.1 Browse

Opens a file browser to select a log file to playback in Workspace.

3.11.3.2.2 Clear

Clears the currently selected log from Workspace.

3.11.3.2.3 Play

Begins playback of the selected log file.

3.11.3.2.4 Step

Moves the log forward by one LCM message.

3.11.3.2.5 Loop

Loop toggles looping for the log. When enabled and the log reaches the end, it will repeat from the beginning.

3.11.3.2.6 Speed Selector

Allows you to adjust the speed at which the log plays back.

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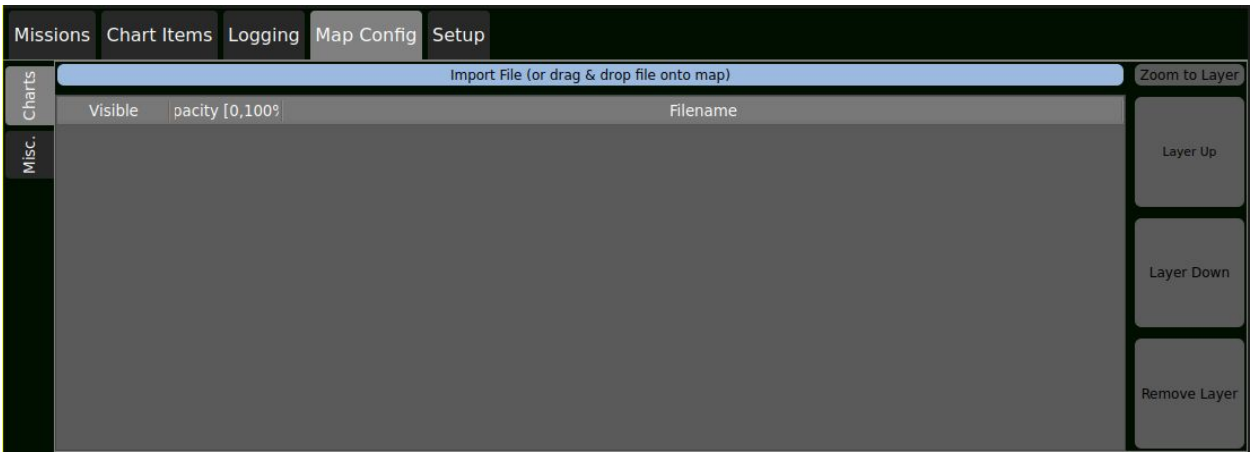
3.11.4 Map Config Tab

The Map Config tab allows you to edit the information displayed on the map.

3.11.4.1 Charts Subtab

The Charts Subtab allows you to add, edit the visibility of, and move the Chart Layers in Mission View.



3.11.4.1.1 Chart Visibility

From the Visible Column, you can toggle whether or not a chart is displayed. The checkbox indicates that the chart is currently visible, if unchecked, the chart will be hidden.

3.11.4.1.2 Chart Opacity

The Opacity field allows you to adjust the opacity of the selected chart layer. By double-clicking the field, you are able to adjust the opacity of the selected chart.

3.11.4.1.3 Zoom to Layer

The Zoom to Layer button moves and adjusts the focus of Mission View to center on and fit the entirety of the selected chart in the view.

3.11.4.1.4 Layer Up / Layer Down

The Layer Up and Layer Down buttons move the selected chart up or down in the chart stack.

3.11.4.1.5 Remove Layer

Deletes the selected chart layer from Mission View.

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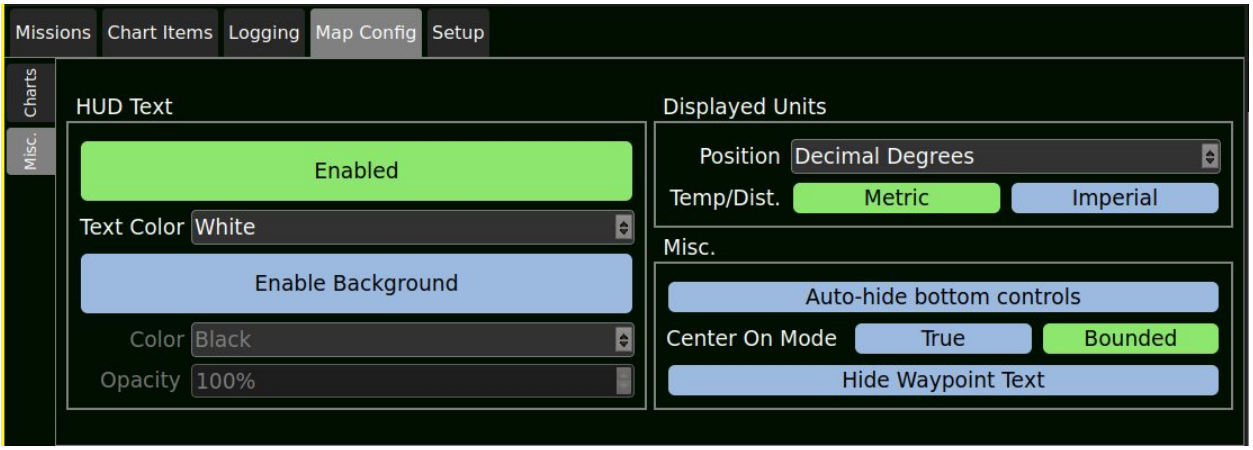
3.11.4.2 Misc. Subtab

The Misc Subtab allows you to configure the Heads-Up Display, displayed units, and button display preferences.



3.11.4.2.1 HUD Text

The HUD text enables or disables the text overlay on Mission View. You can also select the color of the text.

Background color and opacity can be set from a menu of colors based on your preference.

3.11.4.2.2 Displayed Units

Position can be displayed in Decimal Degrees; Degrees, Minutes, Seconds; Degrees, Decimal Minutes; and UTM. As well, you can choose between Imperial and Metric units for Temperature and Distance.

3.11.4.2.3 Misc.

3.11.4.2.3.1 Auto-hide bottom controls

Auto-hide bottom controls will toggle the Mission View Tools to be hidden by default. Once hidden, the menu can be accessed by moving your cursor on the bottom of Mission View.

3.11.4.2.3.2 Center Mode True

Center Mode True disables the Pan Mouse Mode and keeps the selected vehicle in the center of the map at all times.

3.11.4.2.3.3 Hide Waypoint Text

Hides the Waypoint text as it appears in Mission View.

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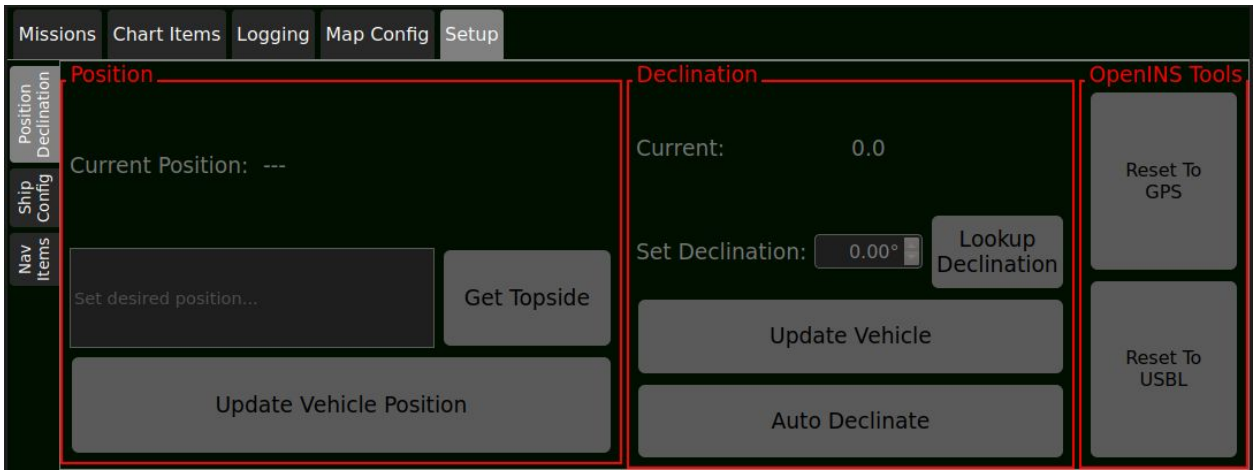
3.11.5 Setup Tab

3.11.5.1 Position Declination Subtab



3.11.5.1.1 Position

Displays the vehicle's current position.

3.11.5.1.1.1 Get Topside

If you have a topside position, you can automatically fill the Set Desired Position… textbox with the current topside position.

3.11.5.1.1.2 Update Vehicle Position

Updates the vehicle position to the position in the Set Desired Position… textbox.

3.11.5.1.2 Declination

NOTE: Lookup Declination requires a valid position.

It will calculate the declination based on the value of the vehicle's current position as displayed in Mission View. If the vehicle's position is 0,0 (as if no real position has been provided) it will calculate the declination at 0,0.

3.11.5.1.2.1 Auto Declination

This button enables Auto Declination Detection; when enabled, the widget will listen for a valid GPS message. If successful, the resulting declination will be pushed down to the vehicle and be posted as both the "Current" and "Commanded" declination values. If the lookup fails, nothing will be pushed to the vehicle and "0.00" will remain in the Commanded value, Current will not be altered. The system will continue to retry declination lookups every 5 seconds as long as valid GPS messages are present.

When auto-declination is active, "Lookup Declination" and "Update Vehicle" will be disabled.

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If you are using Auto Declination and turn it off, declination will not be altered further until you manually update it.

If you are in manual declination mode and turn Auto Declination on, the first valid GPS fix will set the declination.

3.11.5.1.2.2 Lookup Declination

If you are using topside GPS, clicking Lookup Declination will update the commanded declination to the value of your current location.

3.11.5.1.2.3 Update Vehicle

Updates the Vehicle's Declination to the Commanded Declination.

3.11.5.1.3 OPENINS TOOLS

3.11.5.1.3.1 Reset to GPS

Resets the vehicle location to the understood GPS position.

3.11.5.1.3.2 Reset To USBL

Resets the vehicle location to the understood USBL position.

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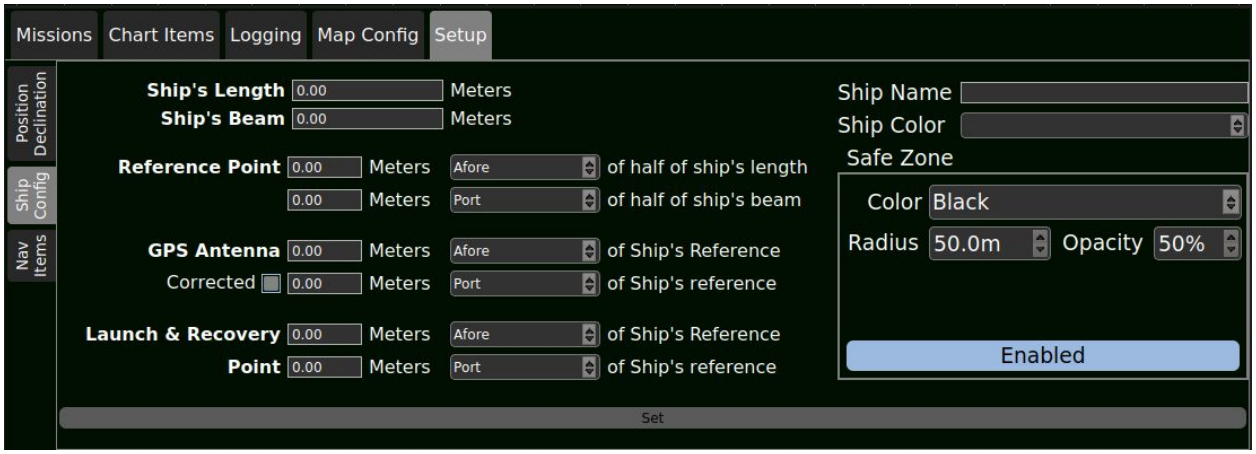
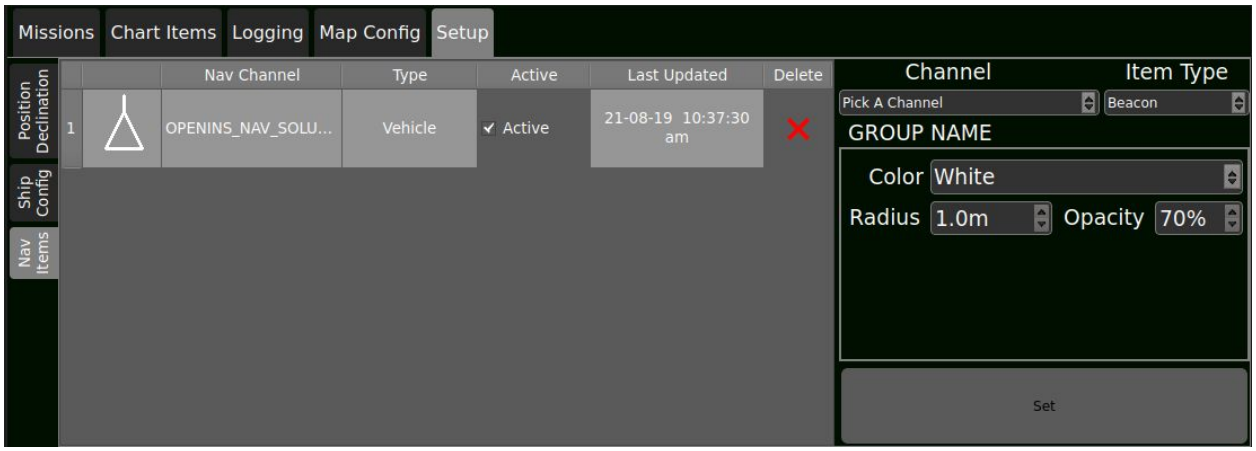
3.11.5.2 Ship Config Subtab

Allows you to define the dimensions and locations of key vehicle features, this includes designated reference point of the ship, the location of the GPS, and a launch/recovery point.



3.11.5.3 Nav Items Subtab



The Nav Items Subtab allows you to create or edit nav items that will appear on Mission View. Beacons can be used to include the location of a USBL, GPS, or other Nav Solution. These can be used as part of troubleshooting or as points of reference.

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Creating a GPS Beacon

1. Select the Setup tab in the Mission View Menu
2. Select the Nav Items Subtab
3. Select the Channel OPENINS_GPS_STAT
4. Use the Item Type Beacon
5. Select the Color for the Beacon
6. Select the Radius
7. Set the Opacity
8. Click The Set button.

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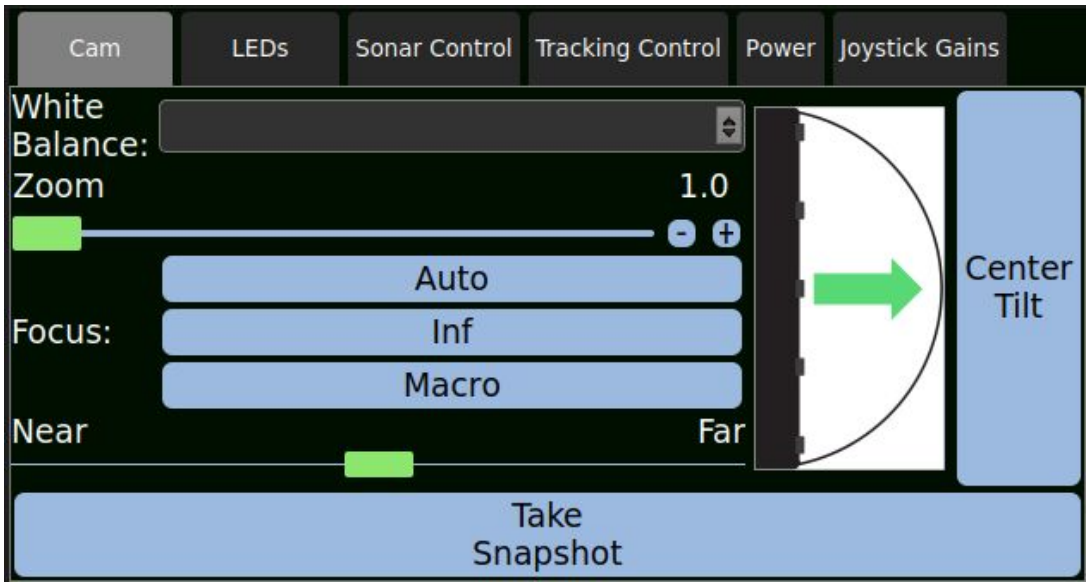
3.12 Control Tools

The Control Tabs are a group of controls found in the lower-right corner of Workspace. They are available in all Flight View configurations except the Chart View. It can be toggled using the F6 Key. There are five tabs within the Control Tabs.

3.12.1 Cam Tab



Allows you to select the White Balance for changing light conditions, zoom, focus, and tilt the camera. You can also use the Take Snapshot button to take a picture using the onboard camera.

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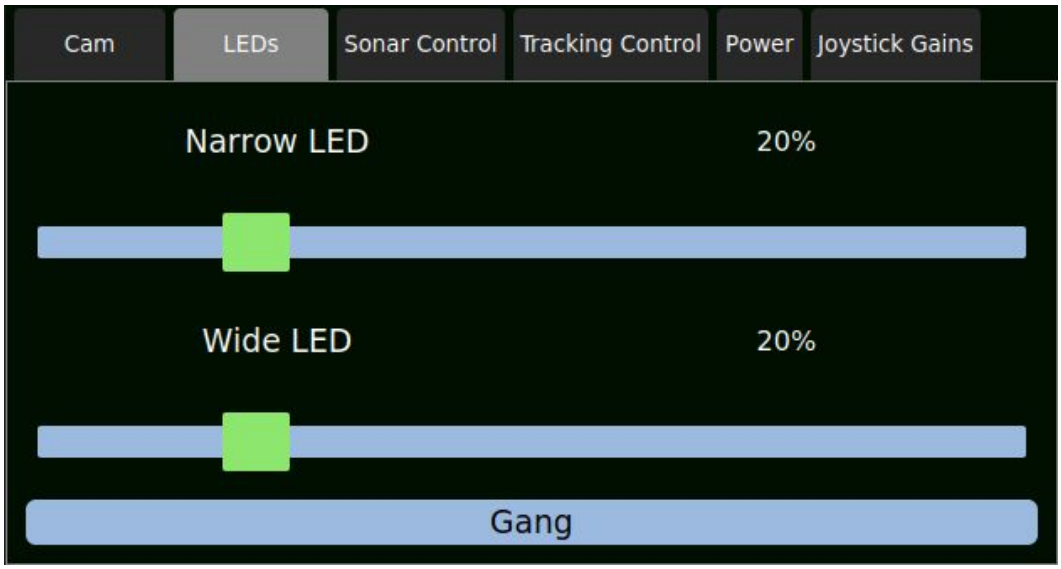
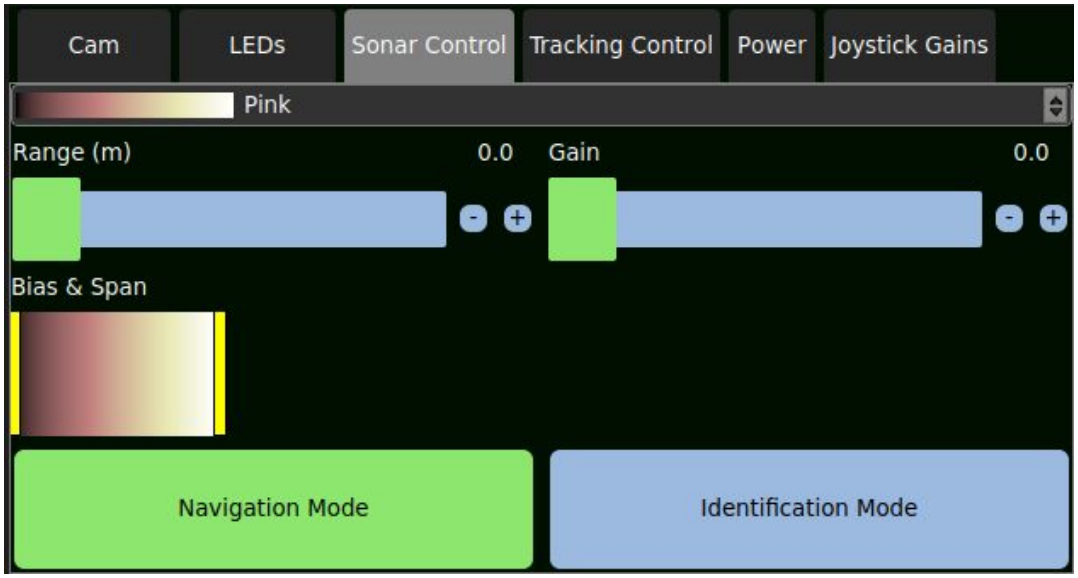
3.12.2 LEDs Tab



Control the total brightness of the LED banks. The Gang button ties these controls together.

3.12.3 Sonar Control Tab



Allows you to adjust the Sonar image, this includes palette, Range, Gain Bias and Span.

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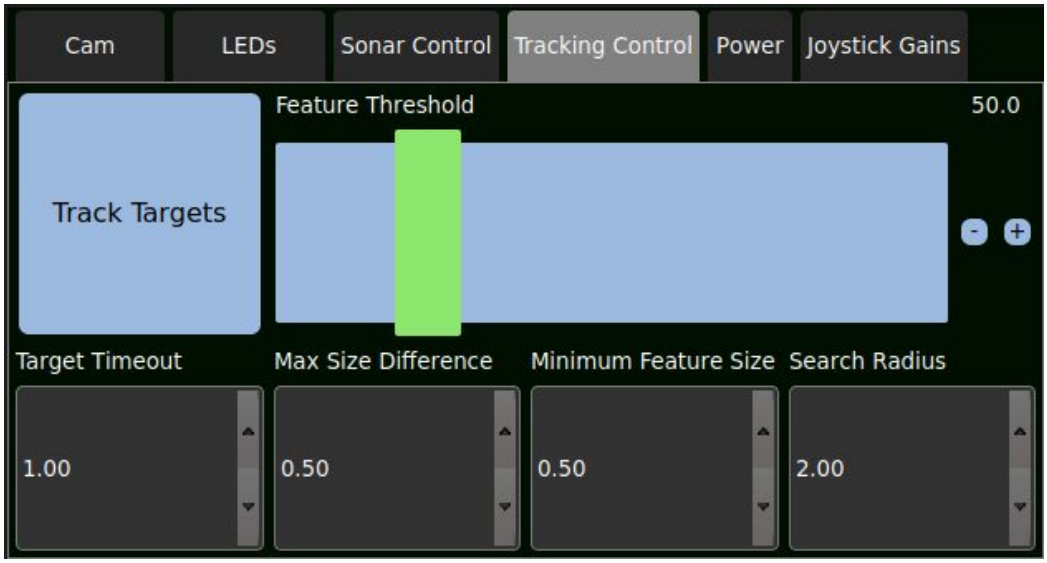
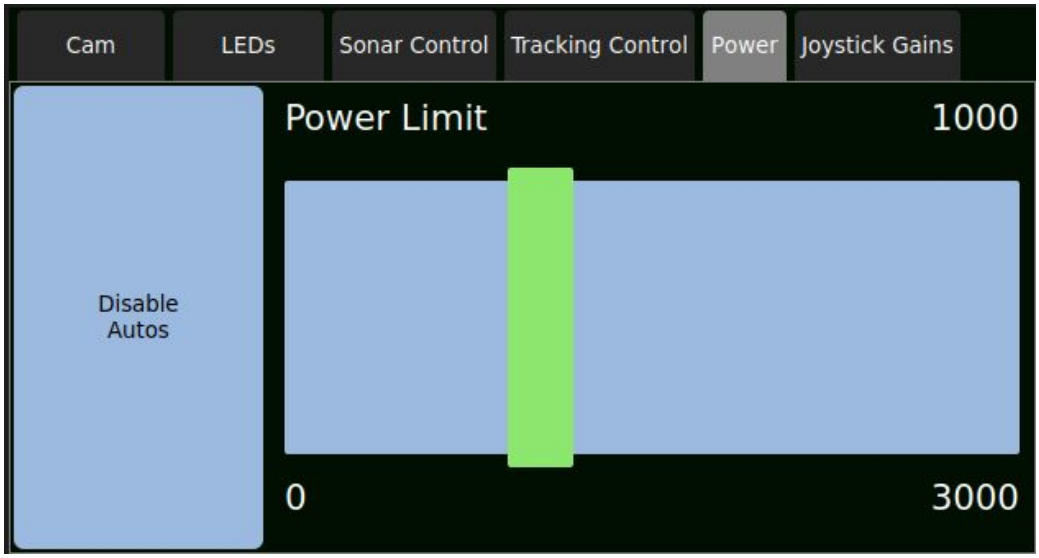
3.12.4 Tracking Control Tab



Enables you to enable and tune the sonar target tracking. You can use these controls to isolate the object you want to track using Sonar Positioning.

3.12.5 Power Tab



The power slider sets the total thruster power. This will affect the autopilot controls overall aggressiveness.

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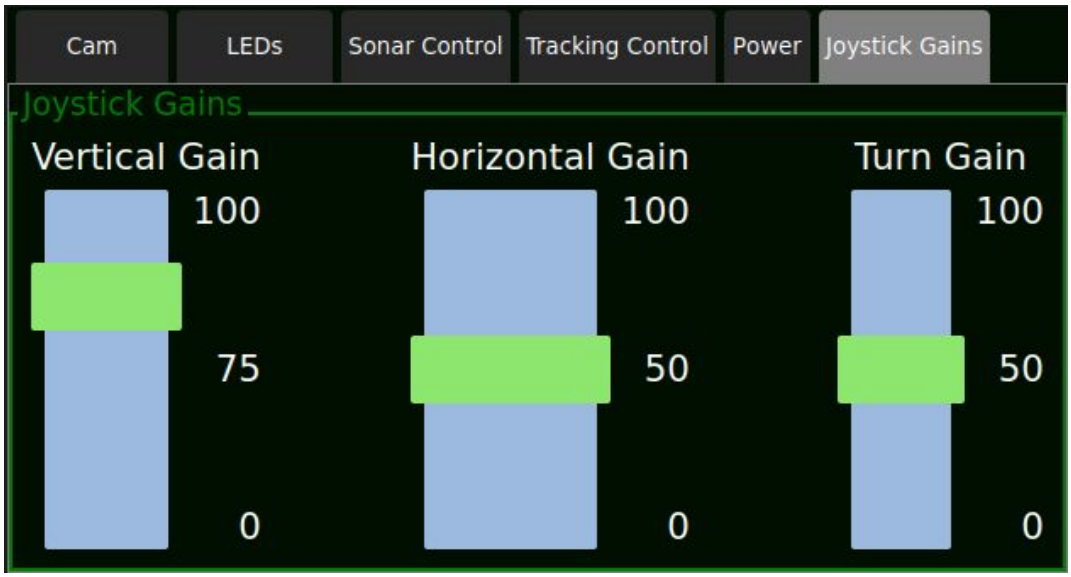
3.12.6 Joystick Gains Tab



Allows you to adjust the gains for the currently connected controller.

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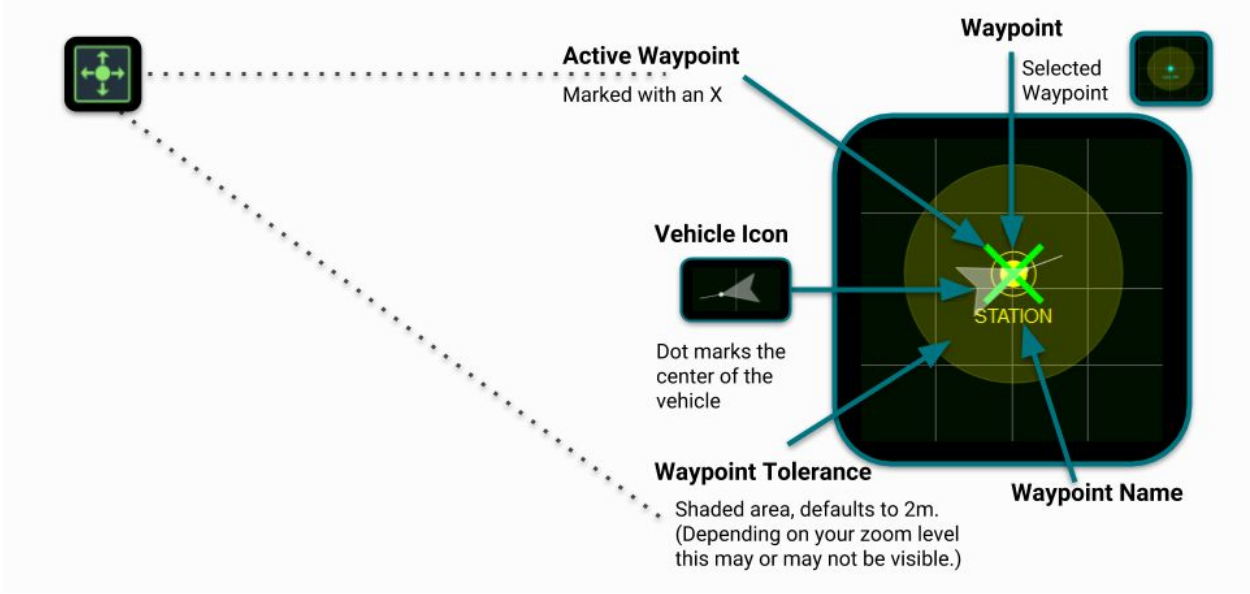
4 Dynamic Waypoint Positioning

Dynamic Waypoint Position is a fundamental concept of operation in EOD Workspace. You are able to control your vehicle by controlling waypoints in real-time without having to plan in advance or push a mission to your vehicle. This section will describe how to direct your vehicle using Dynamic Waypoint Positioning.

4.1 The Waypoint

The first concept to understand with Dynamic Waypoint Positioning is the waypoint. A Waypoint in EOD Workspace is a location in three dimensions.



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4.1.1 Types of Waypoints

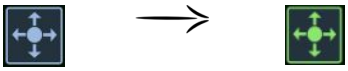
There are three types of Waypoints found in EOD Workspace

- The Active Waypoint
  - The Active Waypoint is marked with a green X.
  - The Vehicle is trying to reach, or is holding at this Waypoint.
  - Step Controls in the Autopilot Jog Window will move this Waypoint.

- Station Waypoint
  - Is Labeled STATION
  - A STATION Waypoint can also be the Active Waypoint.
    - When the STATION Waypoint IS the Active Waypoint, moving the joystick will move the vehicle, when the joystick returns to null the STATION Waypoint will move to the current vehicle position.

- Non-Station Waypoint
  - Named anything other than STATION (usually wypt_XXX)
  - If a Non-station Waypoint is the Active Waypoint
    - Moving the joystick will move the vehicle, when the joystick returns to null workspace will create a new Active STATION Waypoint that is part of the current active mission.

4.2 Enable Positioning



This is the first thing that you will need to enable before you can control your vehicle using Dynamic Waypoint Positioning. When you enable positioning, Workspace will create a mission with a single waypoint. This is your Station Keeping Waypoint.

When you look at this waypoint, you will immediately see some details that will help you understand how to interact with Workspace to create and execute missions.

The most prominent thing you will see on the Station Keeping Waypoint is a bright green X, this marks the location the vehicle is currently traveling to. The vehicle will attempt to achieve and maintain its position based on the location of the X. As you eventually add more Waypoints, the X will always mark the location that your vehicle is traveling toward.

The waypoint is surrounded by an area called the Tolerance, the Tolerance is the area surrounding the waypoint that the vehicle must reach in order to consider the waypoint achieved.

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Waypoints are the building blocks of missions, you can control your vehicle by using a single waypoint, or you can define a specific path using multiple waypoints.

NOTE: Clicking the Positioning button will always stop your vehicle. If you need your vehicle to stop, enable positioning. If you need your vehicle to stop during a mission disable positioning. If currently using positioning, you can also tap your vehicle controls to immediately have Workspace drop a new station keeping waypoint.

4.2.1 Using a Waypoint to Control your Vehicle

You are able to control your vehicle by moving the station keeping waypoint. When positioning is enabled, you can control the vehicle by moving the currently selected waypoint to a new location. To move the waypoint, click and drag it. The vehicle will move in a straight line to reach the location of the waypoint.

4.3 Controlling the Vehicle using Dynamic Positioning

NOTE: Autopilot Jog controls will move the waypoint in relation to the orientation of the vehicle. The forward jog will move the waypoint away from the direction the front of the vehicle while the right jog will move the waypoint to the right of the direction the vehicle is pointing.

When you have positioning enabled you are able to control the vehicle by using the Autopilot Jog window to control the location of the current waypoint. The vehicle will follow this waypoint.

The Autopilot Controls are found in the control widget in the lower-left corner of Workspace.

When you are using the Autopilot Jog Controls to move the vehicle, it is important to understand that you are not directly controlling the vehicle. Instead, you are controlling the waypoints and the vehicle is following those waypoints. The vehicle will travel in a straight line path from its current location to the location of the waypoint. You can use the Autopilot Jog controls to change waypoints on the fly as your mission parameters change.

4.3.1 Step Size Controls

There are some things to consider when using Autopilot Jog controls, first is determining if your current mission requires fine movement. You can adjust the commanded distance your vehicle will move each time you click or tap a control input.

If you want finer vehicle movement, you will likely want your vehicle to move less each time you click one of the Autopilot Jog directional controls. You are able to adjust the jog for XY jog, Turn Jog, and Z Jog independently.

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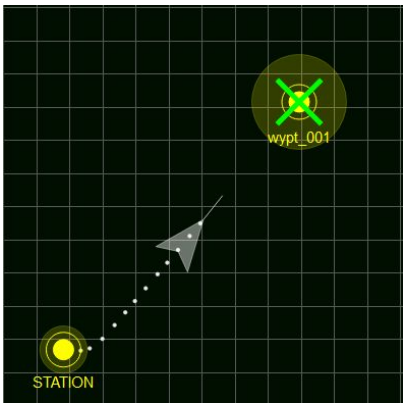
4.3.2 Right Click and Go



With positioning enabled you can quickly command the vehicle to travel to a position by right-clicking on the map to open the M Pop-up menu and select the option Add and GoTo Waypoint, this will add a waypoint and command the vehicle to travel to it. The vehicle will travel in a straight line to reach the new waypoint. As with the Station Keeping waypoint, you can left-click and drag this waypoint to direct the vehicle. You can also right-click a previously added waypoint to command the Vehicle to Go To Waypoint to direct the vehicle to travel to the selected waypoint.

NOTE: A Waypoint created using Right Click and Go will use the Waypoint defaults.

4.3.3 Vehicle Speed

You can control Vehicle Speed from the Autopilot Jogs Window by using the Turtle and the Rabbit. These are fairly self-explanatory, the Turtle will slow down the vehicle while the Rabbit will speed up the vehicle.

4.4 Creating a Mission Using Multiple Waypoints

Now that you're able to control the vehicle with a single Waypoint, the next step is to build a multi-waypoint mission. If this is your first time using multiple waypoints to control your vehicle try you find an unobstructed area free of obstacles.

Click the drop-down in the upper-right corner of Mission View and select Create Mission.... This will open the mission editing window and give you the ability to rename the mission, the mission name will default to the format YYYY-MM-DD.HHMMSS_mission. Once you have created the mission and selected a default color for the mission, click OK. Now you can start adding waypoints to your mission by right-clicking anywhere on Mission View and selecting Add Waypoint.

Add a few waypoints at least 10 meters apart for a test mission. They will be connected by lines, these lines define the route the vehicle will travel on in order to complete its mission. As the vehicle executes this mission, it will attempt to travel along these lines.

Now that you have a few waypoints, right-click the first waypoint on the map and select Go To Waypoint. A few things should happen, the vehicle will begin to travel directly to the selected waypoint, the green X should appear on the selected waypoint, and Workspace will make the selected mission the Active Mission. The route of the active mission will be highlighted by a thick dotted line. The Waypoint the vehicle is moving towards will always be marked with a green X. You are able to click and drag waypoints on the fly and the vehicle will change its course to reach the waypoint.

You can use the Autopilot Controls in the control widget to move the current active waypoint, its speed, and whether or not the vehicle will hold at each waypoint before continuing its mission. You can find the Autopilot controls in the Control Widget in the lower-left corner of Workspace.

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Autopilots Control

Heading Locked to Waypoint

Depth Locked to Waypoint

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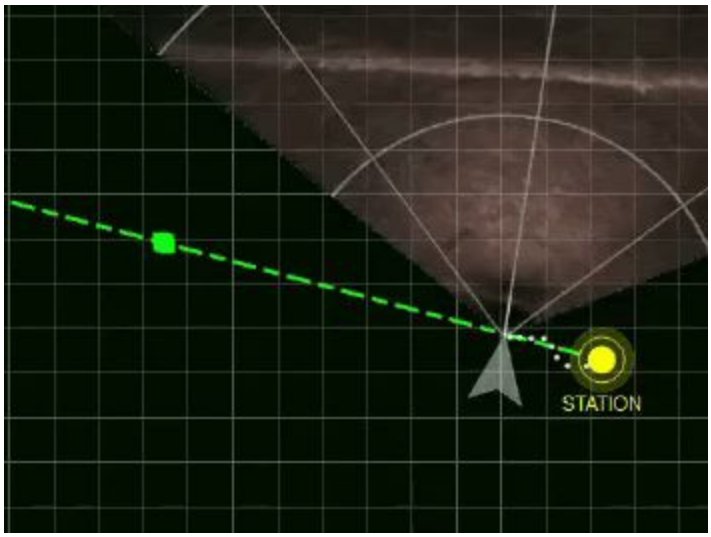
When controlling a vehicle during a multi-waypoint mission, the first thing you should look for is if the Hold Button is enabled or disabled if the hold button is enabled, the vehicle will stop at each Waypoint and hold until you command the vehicle to move to the next or previous waypoint using the forward and back buttons. If the Hold button is disabled the vehicle will automatically begin traveling to the next Waypoint as soon as the Vehicle reaches the waypoint tolerance.

By default, Workspace will adjust the vehicle heading to face the current waypoint it is traveling toward. It will also adjust its depth to match that of the Waypoint. If you want to have independent control of either heading or depth, unlock the Heading and Control in Autopilot Jogs Window (these are shown to the right). With these unlocked, you will be able to use the Autopilot Jog Controls or the vehicle controller to control the vehicle's heading and depth independent of waypoint variables as it moves through mission waypoints. The independent heading control can be used to have the vehicle move laterally to survey features (shown below). When you re-engage the Heading and Depth locks, the vehicle will return to facing the waypoint, and will raise or lower its depth to that of the current waypoint.



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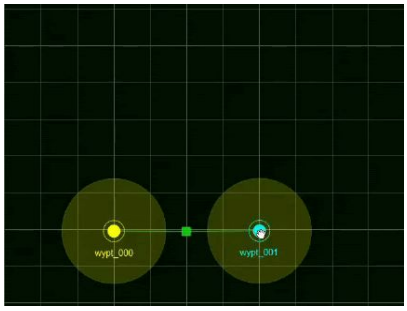
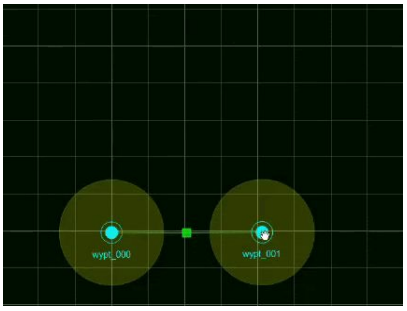
4.5 Dynamic Line Positioning

Each mission is defined not only by the waypoints that comprise it but, more importantly, by the lines between those waypoints. The vehicle will attempt to follow the lines between waypoints while completing missions. When you move a waypoint you will change the lines connecting them. You are able to move a single waypoint by clicking and dragging it, or you can move multiple waypoints by holding the CTRL button when selecting waypoints. When you select and move multiple waypoints at once, the selected waypoints will keep their orientation to each other.

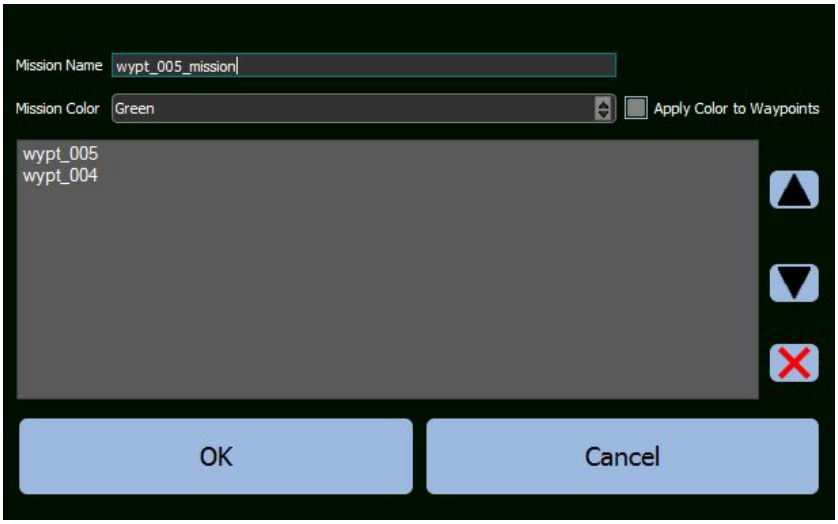


Moving a single Waypoint



Moving Multiple Waypoints

4.5.1 Waypoint Order



By default, the order of the waypoints will be the same as the order they are added to the map. You can click and drag waypoints to reorder their positions to reorganize the mission. Alternatively, you can reorganize the waypoint order within a mission. By double-clicking the mission from the Missions List found in the Missions tab you will open the Edit Mission Window. This will allow you to change the default color of the mission route, or change the order of mission waypoints. To do this, click the waypoint you want to change and then use the up and down arrows to change the position of the waypoint in the list. Click the OK button to change the mission.

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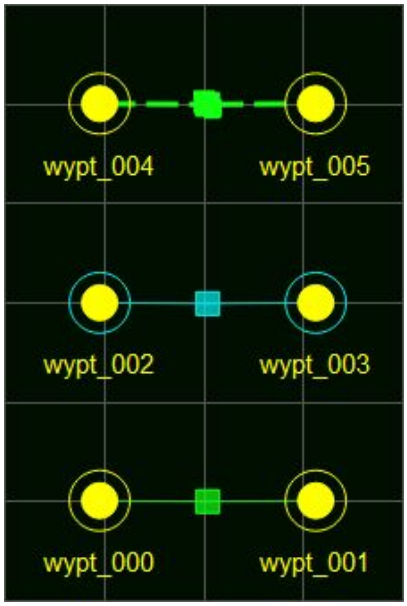
4.6 Multiple Missions

There is no limit to the number of missions you can have in Workspace. However, when you have multiple missions, it is important to be able to keep them straight when working with them. In this section, we'll walk through how to differentiate and work with multiple missions.

4.6.1 Differentiating Between Missions

The first thing you will want to be able to do is to quickly differentiate between missions.



Line Types - There are two basic line types differentiating Missions.

- Thick Dotted Lines - (Shown in the image to the right at the top) This marks the current mission the vehicle is undertaking.
- Thin Solid Lines - These mark other missions. These have been created, but the vehicle is not currently undertaking.

Line Colors - Mission routes will, by default, be colored green (shown at the bottom of the image to the right). You can change the color of each mission individually when editing a mission.

- Cyan - Mission lines that are colored Cyan (shown in the middle of the screenshot to the right) have been selected using the Mission tab in the Mission View Tools at the bottom of the screen.

NOTE: If the mission has only a single waypoint, the circle around the single waypoint will be colored cyan. This can be slightly confusing as when the individual waypoint is selected the entire waypoint will be colored cyan.

4.6.2 Changing Missions

There are two main ways to select a mission as the current mission. You can right-click on a waypoint that is part of the mission and select Go To Waypoint. Workspace will make the mission the waypoint is a part of the active mission, and direct the vehicle will go directly towards the selected Waypoint. You are also able to use the Missions Tab, select the mission from the Missions List, and click the Execute Mission Button. If you do this the vehicle will head directly towards the first Waypoint and will follow the Mission according to what has been enabled in the Autopilot Jogs window.

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4.6.2.1 Directing to the 1st vs Subsequent Waypoints

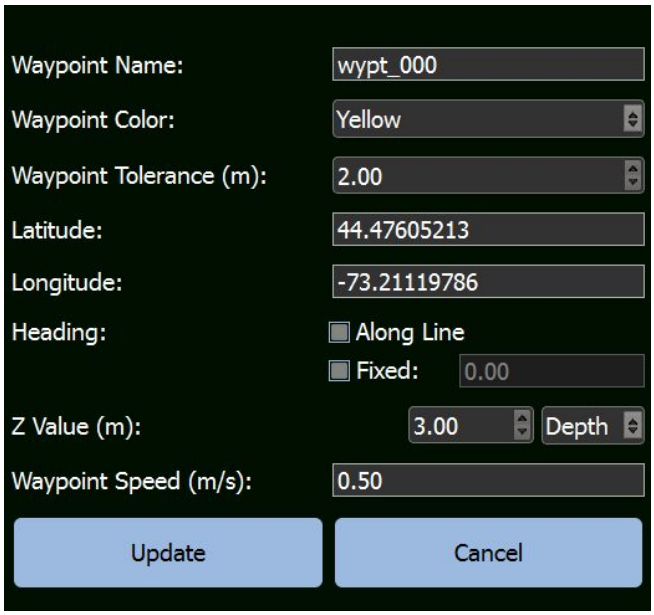
When you are directing the vehicle to Go To Waypoint it is important to understand the behavior of the vehicle. If you are directing the vehicle to go to the first waypoint in the mission, it will take the most direct route to the waypoint. However, if you direct the vehicle to travel to any other waypoint it will attempt to follow the line first before trying to achieve the Waypoint.

NOTE: If that Waypoint has a defined heading, the vehicle will travel using the routes described above, but it will use the defined waypoint heading.

4.6.3 Adding Waypoints to a Specific Mission

To add a waypoint to the specific mission you need to first select it from the Mission Dropdown on the upper right corner of the Map. Whenever you add a waypoint, it will be added to the mission indicated in the drop-down.

4.7 Editing Waypoint Details



Every waypoint has a set of details that can be edited, these changes will affect how the vehicle will interact with the Waypoint. These can be accessed by right-clicking a waypoint and selecting Edit Waypoint... from the list. The first major detail that can be edited is the Waypoint Tolerance(m) this is the radius around the Waypoint; when the vehicle reaches the Waypoint Tolerance, it will consider the waypoint achieved and, if the mission is not paused, will begin traveling to the next waypoint.

You are also able to define the exact latitude and longitude of the Waypoint. This allows you to move a waypoint to an exact location.

The Heading option allows you to select one of two options, Along Line means that the vehicle will "look towards" the line as it travels toward this waypoint or Fixed which allows you to define the heading the vehicle will maintain a while traveling to the waypoint.

Z Value (m) allows you to define the vertical location of the waypoint. This will be either depth or altitude and will be informed by the waypoint tolerance.

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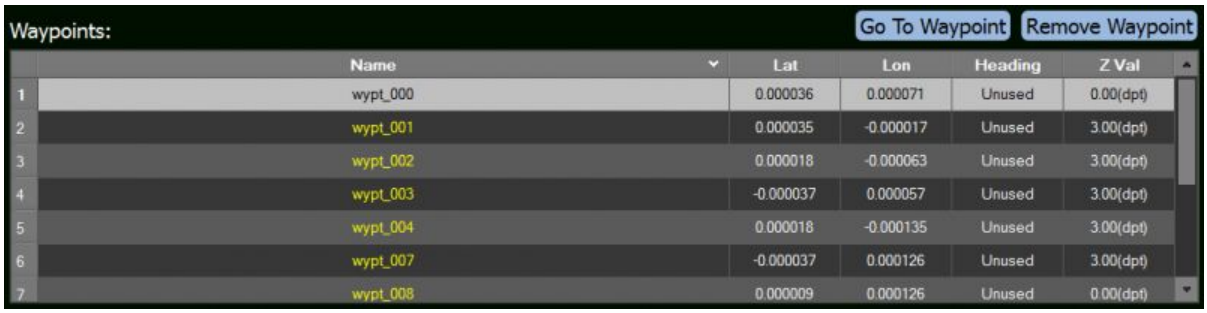
4.8 Using the Mission Tab

Up until this point, you have been editing missions directly by clicking the map, using the quick menus, but you can also edit both missions and waypoints from the Missions Tab in the Mission View Tools. The Missions Tab is divided into two different areas: Waypoints and Missions.

4.8.1 Selecting Waypoints Using the Mission Tab



	Name	Lat	Lon	Heading	Z Val
1	wypt_000	0.000036	0.000071	Unused	0.00(dpt)
2	wypt_001	0.000035	-0.000017	Unused	3.00(dpt)
3	wypt_002	0.000018	-0.000063	Unused	3.00(dpt)
4	wypt_003	-0.000037	0.000057	Unused	3.00(dpt)
5	wypt_004	0.000018	-0.000135	Unused	3.00(dpt)
6	wypt_007	-0.000037	0.000126	Unused	3.00(dpt)
7	wypt_008	0.000009	0.000126	Unused	0.00(dpt)

You can use the Waypoints Tab to select an individual waypoint from the list, just like with clicking a waypoint on the map you can ctrl-click to select multiple waypoints. Additionally, in the Waypoints List, you can shift-click to select all waypoints between the first and last selected waypoints.

Once selected, you can either have the vehicle go to the waypoint or remove it.

NOTE: There is no confirmation when removing waypoints, keep this in mind before you remove a waypoint.

4.8.2 Selecting Missions Using the Missions Tab

You can select your missions from the mission list in the Missions tab. As with Waypoint List, you can select an individual mission from the list, or ctrl-click to select multiple missions. Additionally, in the Missions List, you can shift-click to select all missions between the first and last selected waypoints.

Once selected, you can either have the vehicle execute a mission or remove it, removing all waypoints associated with the mission.

NOTE: There is no confirmation when removing waypoints, keep this in mind before you remove a waypoint.

4.8.3 Saving Missions

To save all missions for future use, clicking the Save button at the bottom of the Missions Tab. This will save all missions and waypoints that are currently in your Workspace session.

NOTE: Only the current missions and waypoints will be saved, markers and regions will not.

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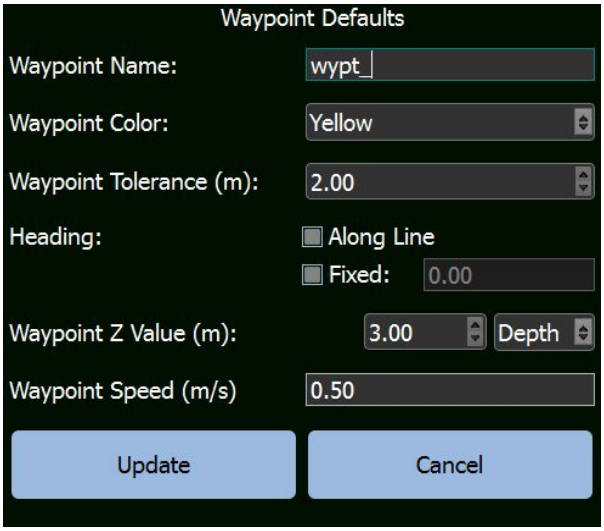
4.8.4 Changing Mission and Waypoint Defaults

From the Missions Tab, you are able to change both waypoint and mission defaults. Clicking on either the Waypoint Defaults... or Mission Defaults... button will allow you to change the defaults for all future Waypoints and Missions.

NOTE: Changing defaults does not retroactively change previously created waypoints or missions. Default changes will only affect missions and waypoints created after the change.



4.9 Point of Interest Control

To enable Point of Interest (POI) Control, click the icon to the left in Workspace. When enabling POI Control, Workspace will orient vehicle control to a specific point. This point will be marked as a green X without a Waypoint. Both Workspace and Vehicle Controls will be oriented towards this point; forward will move the vehicle closer to the Point of Interest and left and right will cause the vehicle to orbit to the left and right of the POI.

NOTE: Enabling POI Control will disable Positioning, and enabling Positioning will disable POI Control.

4.9.1 Setting your POI

You can set your POI in one of two ways,

1. You can click the POI Control button and then left-click a point on Mission View or,
2. You can right-click a point on the map where you want to place the POI and select the Set Point of Interest from the pop-up menu.

Either option will have the vehicle will orient itself to look at the point of interest while holding its position.

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4.9.2 Controlling the vehicle with the POI

When you enable POI, control of the vehicle will change all control to be oriented towards the defined point.

The following control changes occur when POI Control is enabled.

- Joystick X Control will move the vehicle towards or away from the Point.
- Joystick Y Control will orbit clockwise or counterclockwise around the vehicle.
- Joystick Psi is disabled when using POI control.
- Joystick Z operates using Fly-By-Wire Controls.

4.9.3 Using the Sonar Fan and POI

In the upper-right corner of the sonar widget, you will see the icon to the left. Enabling this will overlay the sonar fan onto the map. You can then use the overlay to select a point that you want to set as your Point of Interest. In the example to the right, you can see the vehicle orbiting a location on a pipeline.

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4.10 Waypoints and Regions

4.10.1 Creating a Mission Using Regions

A Region in Workspace is a defined geographical location based around an initial point called a Reference Point. All other points that define a region will maintain a fixed distance from the Reference Point, allowing you to move Regions. These regions can then be used to quickly create survey missions.

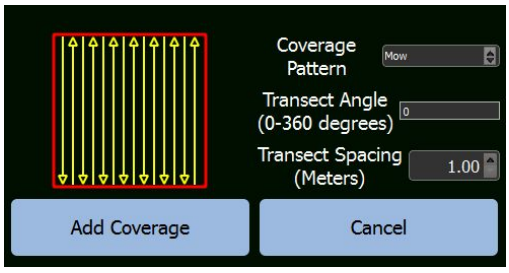
4.10.2 Creating a Region

To create a region, you need to open the Map Config tab in the Mission View Tools and open the Regions subtab. Click the **New Region** button to start clicking on Mission View to add a point, the first point will be your Reference Point. While you are creating a Region every time you click Mission View, you will add a point to the region. When you have finished defining your region, click the Green **Add Points** button, this will stop adding points to the region. If you want to add points later, select the region from the Regions List and then click the **Add Points** button.

NOTE: Each new point must expand the region area, you cannot add a point to an area that within a region.

4.10.3 Creating a Mission using a Region

You can use a region as the basis of a survey mission, creating a defined waypoint mission. To create a region-based survey mission, right-click on the region and select **Set Coverage**, this will open the Define Region Coverage window.



After opening the Define Region Coverage window, the first thing you will want to do is to select your coverage pattern. This is the pattern Workspace will use to generate a mission to cover your defined region. There are three basic pattern types available in Workspace: Mow, Gapped, and Sawtooth. They are shown below.

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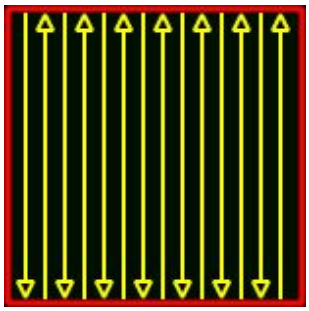
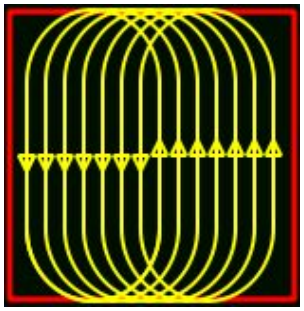
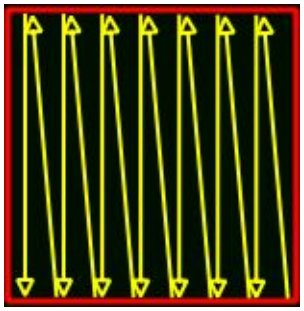


Mow



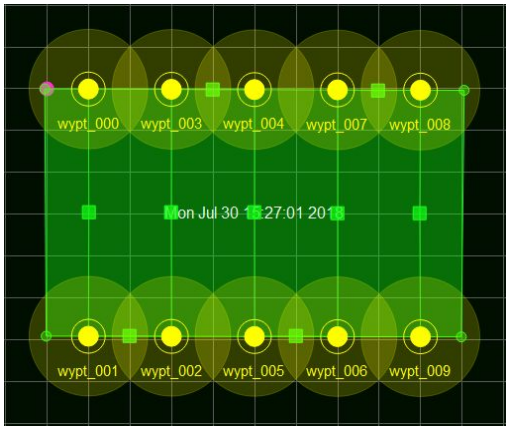
Gapped



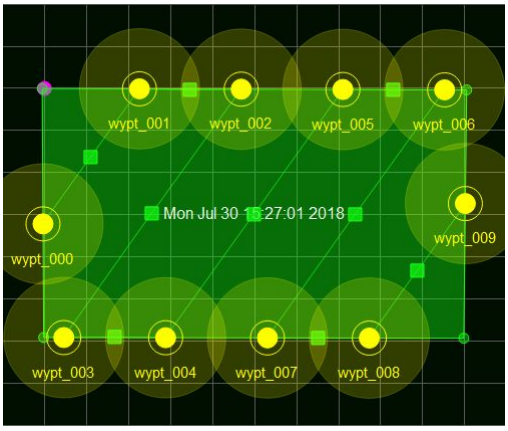
Sawtooth

The type of pattern you will want to choose will depend on the type of survey you are performing; generally, for an average quick survey, the **Mow** pattern is usually a good place to start.

Once you have selected a pattern you want to use to generate a mission, you can modify the orientation of the coverage pattern as it is drawn in the region by selecting a Transect Angle. This will change the rotation of the pattern in relation to the region. The below example is using the Mow Pattern at 0° and 45°.



Transect Angle 0°



Transect Angle 45°

Finally, you can select the spacing distance between each transect by editing the Transect Spacing. A smaller number will result in a finer-grained survey path with more waypoints and a longer mission time, a larger number will result in fewer waypoints, a faster mission time, but this mission might be less through.

Once you've detailed your coverage click the **Add Coverage** button to generate your mission.

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4.10.4 Region and Mission Interaction

After you have created a mission to cover a particular region, you are able to either interact with it independently or as part of the region. You are able to add, move, or remove individual waypoints as with any other mission. You can also use the region as a shortcut to interact with the mission you created.

If you move the region, you can create another mission from it. **NOTE:** That there can only be one mission associated with a region, creating a new mission from a region will delete the previous mission created for the region.

You are also able to start a region coverage mission by right-clicking the region and selecting **Execute Mission**.

5 Diagnostic View

The Diagnostic View is generally not used while performing tasks or completing operations. There are four tabs in the Diagnostic View: Vehicle Configuration, Vehicle NEtwork, Vehicle Sensors, and In this view, you will be able to see the status of all navigational devices connected to both Topside and Subsea as well as the status of vehicle thrusters (if applicable).

5.1 Vehicle Configuration

Vehicle Configuration is broken into four sub areas.

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5.1.1 Temperature

The current Water Temperature. Surrounded by a colored box, it can have two states Red or Green. This tells whether or not Workspace is receiving data from the sensor.

- Green - The Sensor is communicating.
- Red - The Sensor is not communicating.

5.1.2 Joystick Data

Surrounded by a colored box, it can have two states Red or Green. This tells whether or not Workspace is receiving data from the Joystick.

- Green - The Sensor is communicating.
- Red - The Sensor is not communicating.

Communicates the position of each Hand Controller Joystick input. This is useful for diagnosing hand controller inputs that are not in null.

5.1.3 Buttons

Surrounded by a colored box, it can have two states Red or Green. This tells whether or not Workspace is receiving data from the Joystick.

- Green - The Sensor is communicating.
- Red - The Sensor is not communicating.

There are three possible statuses for each possible button LED.

- Blue - The button is inactive, not currently being pushed.
- Green - The button is active, this will only be green when the button is pressed.
- Grey - The button is unavailable, not currently active.

5.1.4 Video Overlay

This is where you are able to select text that will appear on the video Overlay.

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5.2 Vehicle Network

Details the status of each device connected to the network. This includes the thruster, LED Panel, and Camera. The LED for each device identifies whether or not the device has faulted, available information from the device, and Network ID of the device.

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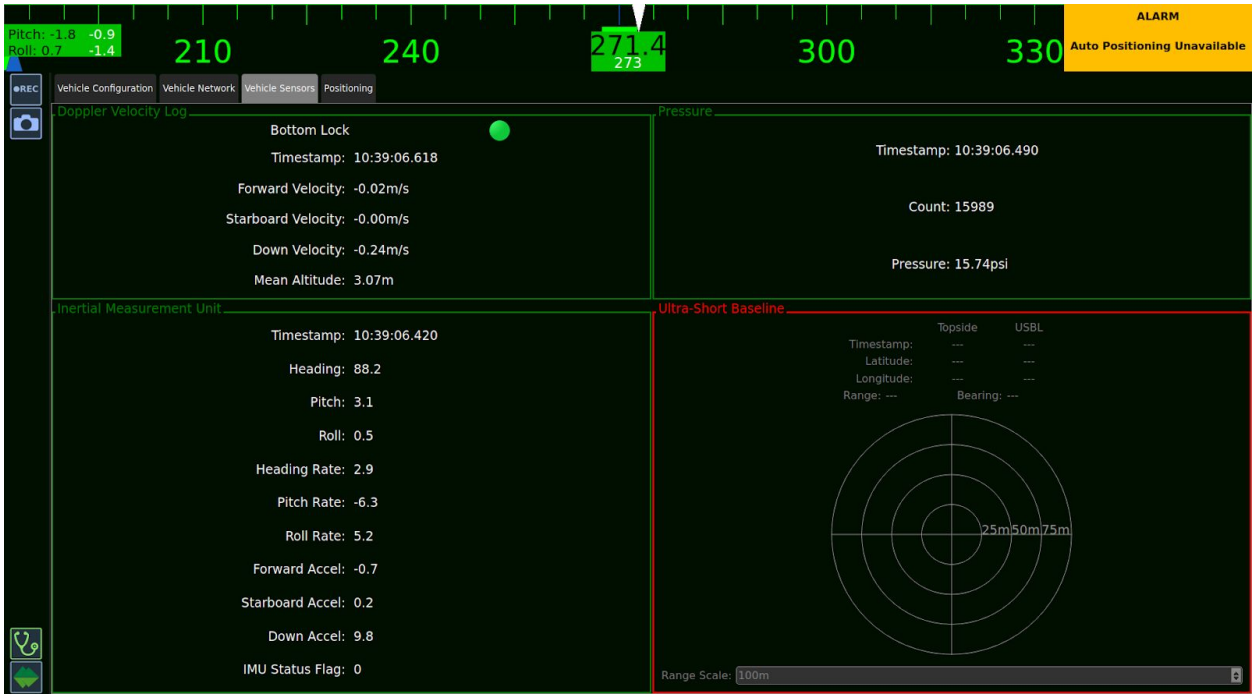
5.3 Vehicle Sensors

Each sensor is surrounded by a colored box, that can have two states Red or Green. This tells whether or not Workspace is receiving data from the sensor.

- Green - The Sensor is communicating.
- Red - The Sensor is not communicating.

Provides the status for the Inertial Measurement Unit (IMU), Pressure Sensor, Doppler Velocity Log (DVL), and Ultra Short Baseline (USBL). If you are having any problems with any of these sensors, this is the first place to look.



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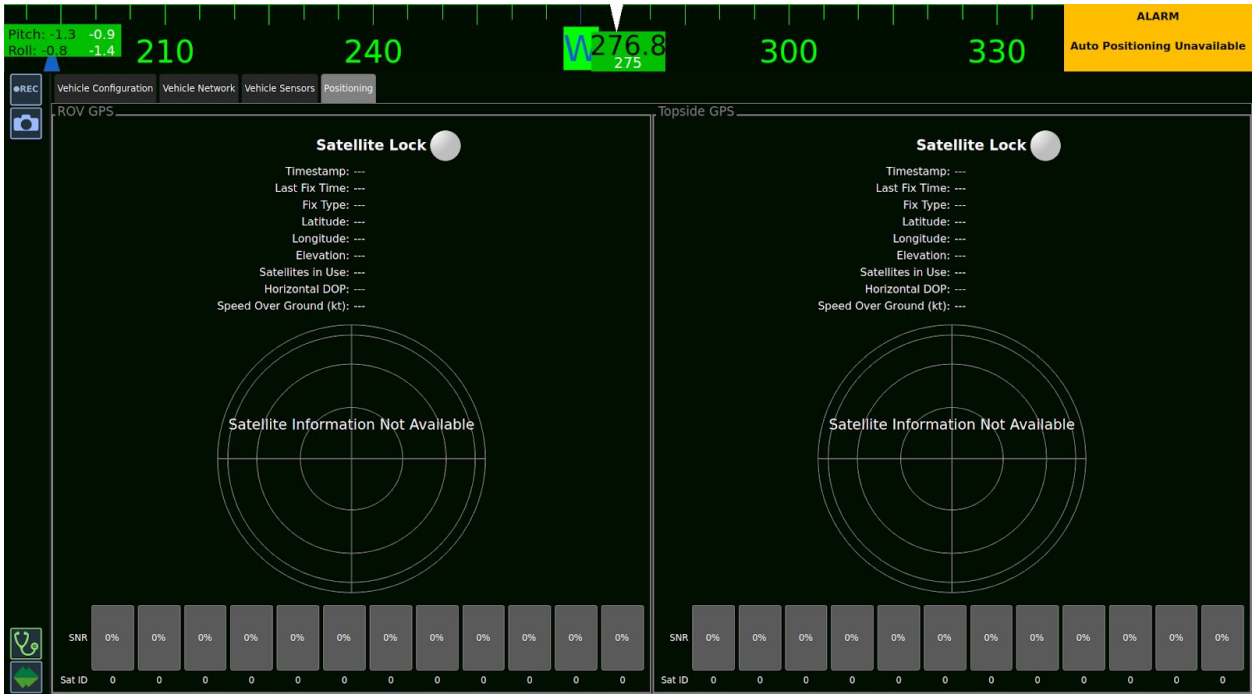
5.4 Positioning

Information regarding the Vehicle GPS and Topside GPS (If present).



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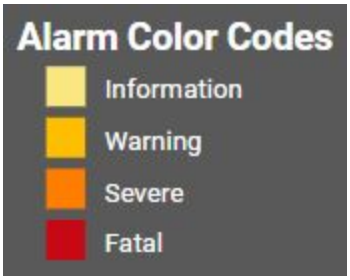
6 Alarms



Alarms are used to alert you when a specific criterion is met. These can be based around any signal, this can be the vehicle reaching a certain depth, or a loss of comms.

The most recent alarms will appear at the upper right-hand corner of Workspace. There are four alarm severity levels ranging from information only, to fatal.

The default alarms and their meanings are listed below.

Alarm	Severity	Meaning
Pitch Control	Info	Pitch Control error is too large, this could mean that the vehicle is stuck on an obstacle.
Roll Control	Info	Roll Control error is too large, this could mean that the vehicle is stuck on an obstacle.
Depth Setpoint Far	Info	Depth setpoint error is too large this could mean that you have pushed the setpoint beyond the bottom. The vehicle may be running into the ground.
Alt Setpoint Far	Info	Altitude setpoint error is too large this could mean that you have pushed the setpoint beyond the bottom. The vehicle may be running into the ground.
Heading Control	Info	Heading Control error is too large, this could mean that the vehicle is stuck on an obstacle.
Warning Thruster Comms Slow	Warning	The communications to the thruster network has slowed. Typically this means a fault within the thruster system. Check thrusters or power to the vehicle.
LED Hot	Warning	LED has gotten hotter than recommended.
Auto Positioning is Unavailable	Warning	The vehicle DVL has lost bottom lock and Dynamic Positioning and POI are unavailable, this can mean that the vehicle is either too close or too far from the bottom.
Nav Initializing	Severe	This occurs when the vehicle is powering on. Wait until this clears before piloting the vehicle.
DEPTH FAIL	Severe	Pressure sensor has failed.

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7 Controller Mapping

7.1 Raw Controller Inputs

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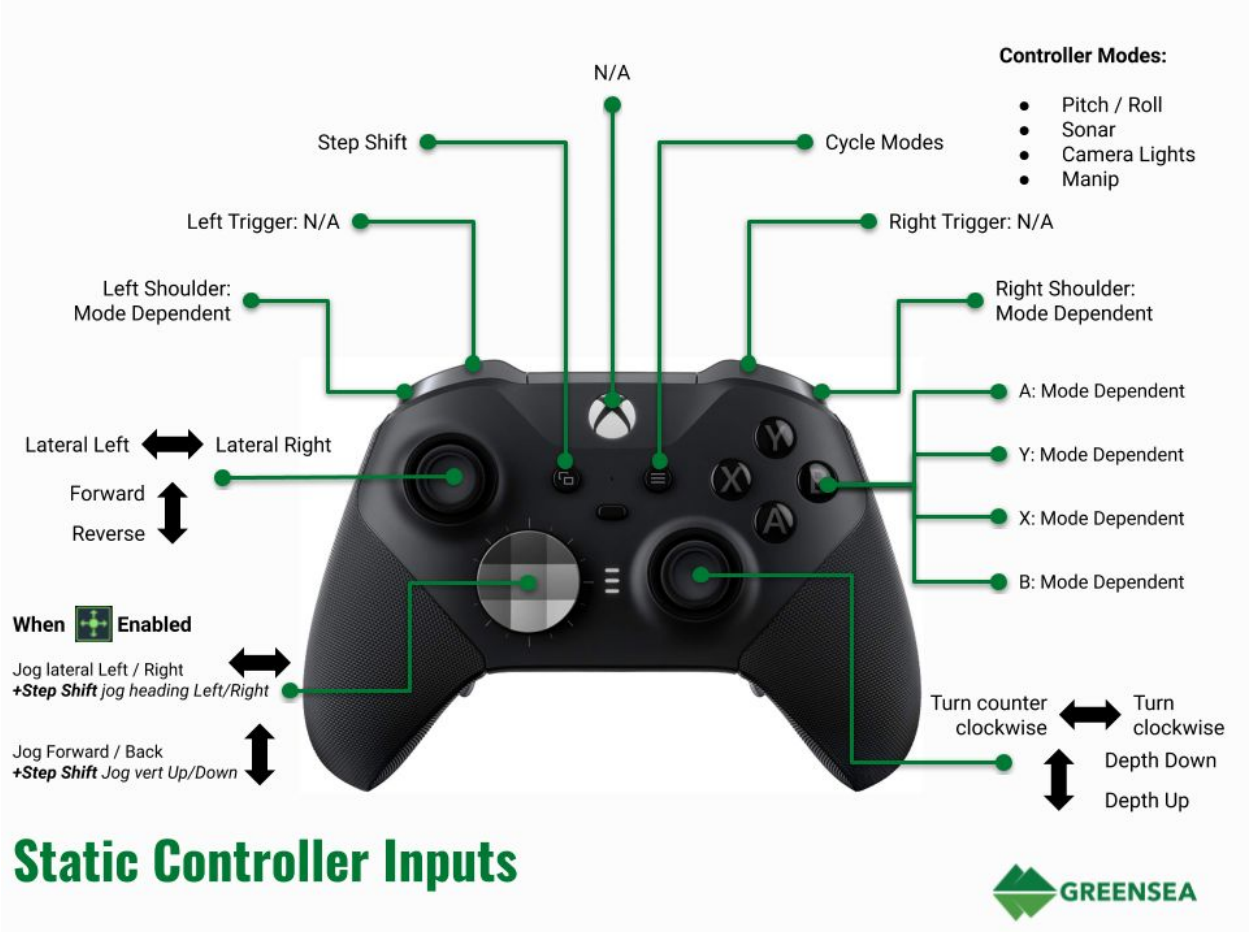
7.2 Static Controller Inputs



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7.3 Pitch/Roll Mode

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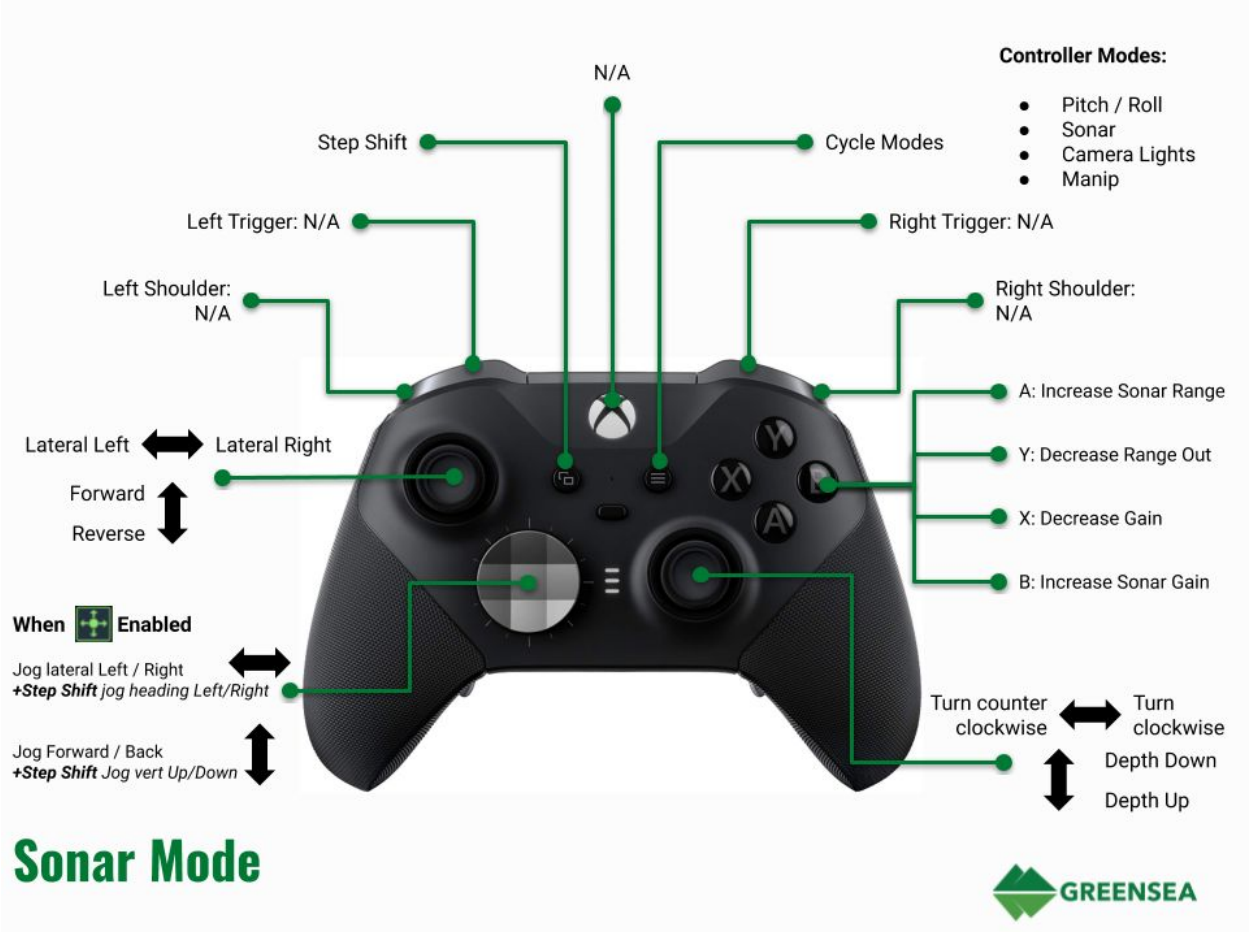
7.4 Sonar Mode



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7.5 Camera Lights Mode

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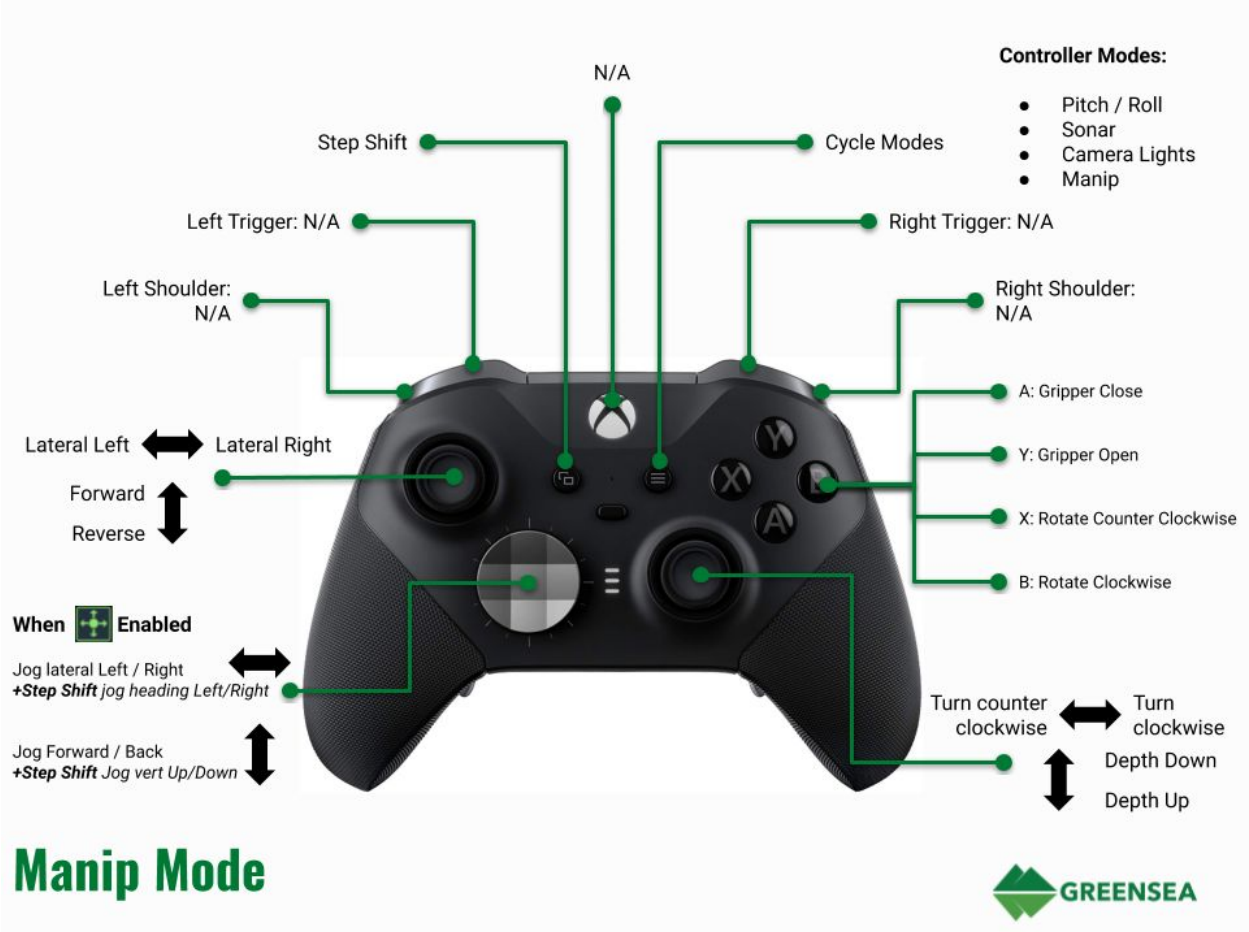
7.6 Manip Mode



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